

# Oscoda Area Schools 2024 Bond Program

## PROJECT MANUAL

Oscoda Area Schools 2024 Bond Program

Community Center Rebid - General Trades, Roofing,  
Flooring & Fire Protection – Rebid of General  
Trades, Flooring, Roofing and Fire Suppression



3/20/2025

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**ARCHITECTS/ENGINEERS**

The Collaborative  
213 Sout Main Street, Ste. 200  
Ann Arbor, MI 48104

THE  
COLLAB  
ORATIVE

**CONSTRUCTION MANAGER**

Wolgast Corporation  
4835 Towne Centre Road, Suite 203  
Saginaw, Michigan 48604  
Telephone: (989) 790-9120



**Bidding Requirements, Contract Forms, and Conditions of the Contract**

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**END OF SECTION 00005**

**Oscoda Area Schools** will receive sealed bid proposals for construction trade work from qualified contractors for the **Oscoda Area Schools 2024 Bond Program, Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection** . A pre-bid meeting and project walk-through will be conducted by the Construction Manager, Wolgast Corporation, and the Architect, **The Collaborative**, on **4/9/2025**, at **3:30 PM**(local time) at **Administration Board Room**.

Hard Copies of Proposals may be mailed or delivered in person to **Scott Moore, Superintendent**, c/o **Oscoda Area Schools, 3550 E. River Rd., Oscoda, MI 48750**. Proposals must be received prior to **3:30 PM** (local time) on **4/9/2025**, at the **Oscoda Area Schools Administration Building**

Electronically Sealed Proposals can be submitted via. Building Connected <https://app.buildingconnected.com/login?retUrl=%2F> Proposals will be publicly opened and read aloud at **3:35 PM** in the **HS Cafeteria and Virtually**. Please note you must be invited to BuildingConnected for the bid division you will be bidding in order to submit an electronic bid. Email [chuver@wolgast.com](mailto:chuver@wolgast.com) if you need to receive an invitation.

All bids will be evaluated after the bid opening. All bids received after **3:30 PM** of the bid date will be returned to the Bidder unopened.

The Project will utilize separate prime contractors. All contracts for construction will be direct contracts with the Owner. Overall administration of the Project will be the responsibility of the Construction Management Firm, Wolgast Corporation, 4835 Towne Centre, Suite 203, Saginaw, Michigan 48604, Phone: (989) 790-9120, Fax: (989) 790-9063. The Owner will award contracts shortly after April 9<sup>th</sup>, 2025, to separate prime contractors for separate bid divisions or combinations of bid divisions. A Bidder may submit a proposal on more than one Bid Division; however, a separate bid must be submitted for each Bid Division of a combined bid. All bids shall be submitted on the bid forms provided in the project specifications, completely filled in, and executed (copies of the bid forms are acceptable). Facsimile bids will not be accepted.

The Bidders shall read and review the Bidding Documents carefully and familiarize themselves thoroughly with all requirements.

Requests by Contractors for inclusion, as Bidders shall be addressed to Wolgast Corporation. Plans may be obtained from Wolgast Corporation, attention **Christie Bigelow-Huver** [chuver@wolgast.com](mailto:chuver@wolgast.com). All questions regarding the bidding procedures, design, and drawing/specification intent are to be directed to the Construction Manager on a Clarification Request Form (Section 00310), attention **Matt Moser** @ [mmoser@wolgast.com](mailto:mmoser@wolgast.com) and cc [chuver@wolgast.com](mailto:chuver@wolgast.com).

A Bid Security by a qualified surety authorized to do business in the state where the Project is located in the amount of five percent (5%) of Base Bids shall accompany each proposal or proposal combination. The Bid Security may be in the form of a Bid Bond, Cashier's Check, or Money Order. Personal checks are NOT acceptable. Bids may not be withdrawn for a period of sixty (60) days after the bid date. Successful Bidders may be required to furnish Surety Bonds as stated in the Project Specifications (Section 00600).

The Owner reserves the right to reject any or all proposals, accept a bid other than the low bid, and to waive informalities, irregularities, and/or errors in the bid proposals, which they feel to be in their own best interest.

All bidders must provide familial disclosure in compliance with MCL 380.1267 and attach this information to the bid. The bid shall be accompanied by a sworn and notarized statement disclosing any familial relationship that exists between the Owner or the employee of the bidder and any member of the board, intermediate school board, or board of directors or the superintendent of the school district, intermediate superintendent of the intermediate school district, or chief executive officer of the public-school academy. The District shall not accept a bid that does not include this sworn and notarized disclosure statement.

**END OF SECTION 00010**

**PART 1 – GENERAL**

**1.01 DEFINITIONS**

- A. The Owner is: **Oscoda Area Schools.**
- B. The Architect is: **The Collaborative.**
- C. The Construction Manager is: **Wolgast Corporation.**
- D. The Project Team consists of the Construction Manager, the Architect, and other design professionals providing services in connection with the project.
- E. The Project is: **Oscoda Area Schools 2024 Bond Program, Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection**
- F. Work is any portion of the Project.
- G. The Bidding Documents include (as applicable to the Project):
  - 1. The Notice to Bidders.
  - 2. The Instructions to Bidders.
  - 3. Bid Division Descriptions.
  - 4. Proposal Forms.
  - 5. Sample Contract Forms.
  - 6. The Specifications for the Project.
  - 7. The Drawings for the Project.
  - 8. All Addenda issued for the Project.
  - 9. The Preliminary Milestone Schedule.
- H. Addenda are written and/or graphic instruments issued by the Architect, which add to, delete from, clarify, or correct the Bidding Documents.
- I. Bids are sums stipulated in Proposals for which Bidders propose to perform the Work of Bid Divisions.
- J. Base Bids are sums stipulated in Proposals for which Bidders offer to perform the Work of Bid Divisions, and which Alternate Bids may be added to or deleted from.
- K. Alternate Bids are sums that may be added to or deleted from Base Bids for the performance of Alternate Work, as delineated in the Bidding Documents.
- L. Unit Prices are sums included in the Proposals as Bids per unit measure of materials and/or services, as required by the Bidding Documents.
- M. Proposals are complete, properly executed forms including Base Bids, Alternate Bids, Unit Prices, and other information requested by the Owner.
- N. Bidders are pre-qualified contractors who submit proposals to the Owner for Work as Prime Contractors on the Project.
- O. Bid Divisions are the divisions of Work into which the Project is divided for bidding. Bid Divisions shall not be confused with Technical Specification Divisions.
- P. Bid Division Descriptions (Section 00309) are written descriptions of the Work included in the Bid Divisions.



**1.02 MULTIPLE PRIME CONTRACTS/BID DIVISIONS**

- A. This is an Owner Represented Project. There is no General Contractor. All contracts awarded on the Project shall be prime contracts. The Owner will award contracts for each Bid Division and/or for groups of Bid Divisions. The Construction Manager will administrate the Project.
- B. Although each Bid Division involves an obvious and recognizable segment of “conventional” trade contracting, multiple contract project delivery requires that adjustments be made to permit the completion of each Bid Division as a separate segment of construction. Each bidder shall carefully review the total scope of their responsibilities with respect to the Work of their Bid Division(s) and shall provide for the total scope in their Proposal.
- C. Bid Division Descriptions (Section 00309) have been written to clearly delineate each Bid Division. The Owner is not responsible for a Bidder’s interpretation of the Bid Division Descriptions. Bidders are encouraged to request information by calling or emailing the Project Manager:

**Matt Moser**, Project Manager, Wolgast Corporation, (989) 598-9251 or [mmoser@wolgast.com](mailto:mmoser@wolgast.com).

- D. For the purpose of clarity, the scope of work for each Bid Division may be divided into four categories: “GENERAL INCLUSIONS,” “DIVISION INCLUSIONS,” “PROJECT INCLUSIONS,” AND “EXCLUDED.”
1. Information provided under the heading “GENERAL INCLUSIONS” is the obvious and/or “conventional” work scope of each Bid Division.
  2. Information provided under “DIVISION INCLUSIONS” or “PROJECT INCLUSIONS” points out items which may be considered less obvious or “unconventional,” but which are included in the work scope of a particular Bid Division. (Information under these headings are not always necessary to delineate a Bid Division.)
  3. Information provided under “EXCLUDED” is for the purpose of indicating beginning and termination points, and/or to provide an understanding of fringe involvement included in Bid Divisions. (Information under this heading is not always necessary to delineate a Bid Division.)
- E. **Bidders shall construe nothing contained in the Bidding Documents, including the Bid Division Descriptions, as an assignment of work to any construction industry trade. Each Bidder is responsible for their own work assignments when making their proposal.**

**1.03 INTERFACING BID DIVISIONS**

- A. Each Bidder shall familiarize themselves with the work scope of all Bid Divisions that interface with their own. Each Bidder shall consider that the work of their Bid Division(s) may follow the work of another Division or other Divisions, and that other Contractors may perform work after the work of their Bid Division(s), and that other Contractors may work simultaneously with the work of their own Bid Division(s). Each Bidder shall include provisions for such interfaces and for cooperation with interfacing Contractors in their Proposal.

**1.04 PRE-BID CONFERENCE**

- A. **Virtually  
3/25/2025 @ 11:00 AM link is in the project files on Building Connected. You can also email  
[chuver@wolgast.com](mailto:chuver@wolgast.com)**

**1.05 BIDDING DOCUMENTS**

- A. Qualified Bidders have received sets of Bidding Documents. Requests from Bidders for additional sets of Bidding Documents will be honored under the conditions set forth in the Notice to Bidders (Section 00010).
- B. Following the award of construction contracts for the Project, all sets of Bidding Documents, plans, and specifications, except sets in possession of Contractors who have been awarded contracts, shall be returned to the Project Team.
- C. Bidders who return sets of Bidding Documents, plans, and specifications, in reasonably good condition shall have their plan deposit returned within ten (10) days of the Project Team's receipt of the documents.
- D. Bidders shall use complete sets of Bidding Documents in preparing Proposals. Bidders are responsible for ascertaining that the Bidding Documents upon which their Proposals are based are complete.
- E. Bidding Documents are provided to Bidders for uses pertaining to bidding only. No other use is permitted.
- F. Bidders shall promptly notify the Project Team of any ambiguities, inconsistencies, errors, and/or omissions they may discover in the Bidding Documents.
- G. Requests from Bidders for clarification or interpretation of the Bidding Documents must reach the Project Team five days before the bid date or by the date addressed in the pre-bid agenda. Any bidder clarifications which reach the Project Team after such dates have passed will not be considered.
- H. Changes and corrections to the Bidding Documents will be made by Addendum and distributed to Bidders.
- I. Each Bidder shall ascertain prior to submitting their Proposal that they have considered every Addendum issued prior to the Bid Date and shall acknowledge receipt of each Addendum in writing in their Proposal.

**1.06 PRELIMINARY MILESTONE SCHEDULE**

- A. The Preliminary Milestone Schedule is Section 00999 of this Project Manual.
- B. A Preliminary Milestone Schedule has been developed by the Construction Manager and supplied to the Bidders. Each Bidder is required to review the dates indicated in that Schedule, and either endorse or amend them within the context of the Bid Division(s) they are bidding. Space is provided on the Proposal Form for endorsement or amendment. The Milestone Schedule and the information it provides are not part of the Contract Documents.
- C. The milestone dates as endorsed and/or amended by successful bidders and accepted by the Owner will be used in the development of a Master Schedule to be used as a guide during the construction of the Project.
- D. Each Bidder is obligated to comment, in writing, on the Milestone Schedule if, in their opinion, the dates do not depict realistic time interval(s) for performance of the Work of their Bid Division(s)
- E. The effect of endorsements of and amendments to the Milestone Schedule will be considered when selecting Bidders for contract awards.

**1.07 BID SECURITY**

- A. Bid Security is required for this Project in the amount of five percent (5%). A surety company licensed, as such, to do business in the State of Michigan, must issue the Bid Bond, and all other Bonds. For additional information and instructions regarding Bid Security, refer to Section 00410.

**1.07.1 AFFIDAVITS ACCOMPANYING BID PROPOSALS**

- A. All Bid Proposals shall include the Familial Affidavit form (see Section 00306 – Familial Affidavit) to be included as part of the Bid Proposal.
- B. All Bid Proposals shall include the State of Michigan required Iran Economic Sanctions Affidavit form (see Section – 00307 – Iran Economic Sanctions) to be included as part of the Bid Proposal.

**1.08 SUBSTITUTIONS**

- A. The materials, products, and equipment described in the Bidding Documents establish the quality standard, required function, dimensions, and appearance, which shall be met by all substitutions.
- B. Contractors may request items not included in the construction bid documents be considered for inclusion as acceptably specified items by submitting a written request to the Project Team addressed to the Construction Manager not later than ten (10) days prior to the bid date. The Construction Manager will forward these written requests to the Architect who will make the determination whether the requested item is an acceptable “equal”. These acceptable “equal” items will be identified as acceptable by their inclusion in a written Addendum.
- C. Each substitution request will include a complete description of the proposed substitute, drawings, cuts, performance and test data, the name of the material or equipment for which it is to be substituted, and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment, or Work that incorporation of the substitute would require should also be included. The burden of proof of the merit of the proposed substitute is upon the Bidder. The Architect’s approval or disapproval of a proposed substitution shall be final.
- D. The bidder’s Base Bid contained in the Bid Proposal Form shall be the exact items contained in the construction bid documents (plans, specifications or addenda). The Base Bid contained in the Bid Proposal Form shall not include any substitute items not allowed in the construction bid documents.
- E. Bidders that have other substitutions to be considered for inclusion in the Project must identify them as Voluntary Alternates in the portion of the Bid Proposal Form so designated. The identity of these items must include the all product information and the dollar amount of increase or decrease associated with each individual substitute item.
- F. By making requests for any substitution, the Contractor represents:
  - 1. The Contractor has personally investigated the proposed substitution product and determined that it is equal to or superior to the product specified.
  - 2. The Contractor will provide the warranty for the substitution as the product specified.
  - 3. The cost data presented is complete and includes all related costs required for it to be incorporated into the Project including costs for additional Architectural and/or Construction Management services.
- G. The Architect will reply in writing to the Contractor, through the Construction Manager, stating whether the Owner or Architect, after due investigation, has reasonable objection to any substitution request. The decision of the Architect shall be final.

**1.09 VOLUNTARY ALTERNATES/VALUE ENGINEERING SUGGESTIONS**

- A. Base Bids and Alternate Bids shall be based upon the Bidding Documents, including approved substitutions, and on the Bidders’ evaluation of the Project Site. However, the Owner invites Voluntary Alternates or Value Engineering suggestions consistent with the intent of the Bidding Documents. Such Alternates and suggestions, if submitted, shall be incorporated into Proposals by describing Voluntary Alternate(s) on company letterhead and attached to the Bid Proposal Form.

**1.10 BID OPENING AND CONTRACT AWARDS**

- A. Bids will be opened publicly after the time and date established for receipt of Proposals. Bid Summaries will be made available to Bidders by request after the Bid Date, but not before Post Bid Interviews have been conducted.
- B. Contract awards will be based on Bidders' Proposals and ability to perform. The Owner intends to award contracts to Bidders who submit proper Proposals in accordance with the requirements of the Bidding Documents.
- C. Decisions regarding Bidders abilities affecting contract awards will be made by the Owner.
- D. The Owner reserves the right to waive any informality or irregularity in any Proposal.
- E. The Owner reserves the right to reject any Proposal.
- F. All awards will be made in the Owner's best interest.

**1.11 POST-BID INTERVIEWS**

- A. Bidders in contention for contract awards will be required to attend Post-Bid Interviews and submit post-bid submittals in rough draft for review.

**1.12 POST-BID SUBMITTALS**

- A. Bidders who have been notified of the Owner's intent to award a contract shall submit the following items to the Construction Manager:
  - 1. A Schedule of Values utilizing the level of detail requested by the Owner (reference Section 00670).
  - 2. A list of all subcontractors and suppliers to be used, and all items of material and equipment to be incorporated into the Project (reference Section 00680).
  - 3. The name(s) of the on-site supervisor(s) whom the Bidder proposes to employ to accomplish the Work (reference Section 00690).
  - 4. Sample copies of the construction contracts are included in Sections 00510.

**1.13 OWNER'S RIGHT TO APPROVE SUPPLIERS, SUBCONTRACTORS, MATERIALS, EQUIPMENT, AND EMPLOYEES**

- A. Bidders will be required to establish, to the satisfaction of the Owner, the reliability and responsibility of proposed employees, suppliers and subcontractors, and the suitability of proposed materials and equipment.
- B. Prior to the award of a contract, the Construction Manager will notify the Bidder if the Owner has reasonable and substantial objection to any person, organization, material, or equipment listed by the Bidder. If the Owner has a reasonable and substantial objection, the Bidder shall amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute, or they may disqualify the Proposal.
- C. Suppliers, subcontractors, employees, materials, and equipment proposed by the Bidder and accepted by the Owner shall be used on the Work for which they are proposed and accepted and shall not be changed except with the written approval of the Owner.

**1.14 BONDS**

- A. Refer to Section 00600 for information and instructions regarding the bond requirements of this Project.

**1.15 INSURANCE**

- A. Refer to Sections 00650, and 00700 for information and instructions regarding insurance requirements for this Project.

**PART 2 – FORMS FOR BIDDING**

**2.0 PROPOSAL FORMS**

- A. Bidders are required to use the forms provided by the Owner for bidding purposes.
- B. Sample form(s) and instructions are in Section 00305 of this project manual.

**PART 3 – PROCEDURES AND CONDITIONS FOR BIDDING**

**3.01 COMPLETION OF PROPOSAL FORMS**

- A. Refer to Section 00300 for detailed information and instructions regarding completion of Proposal Forms.

**3.02 SUBMISSION OF PROPOSALS**

- A. Hard Copies of Proposals shall be submitted to:

Oscoda Area Schools  
Scott Moore, Superintendent  
3550 E. River Rd.  
Oscoda, MI 48750

**Or upload to Building Connected <https://app.buildingconnected.com/login?retUrl=%2F>**

(Refer to Section 00010 – Notice to Bidders for additional information and instructions regarding the location for submittal of Proposals.)

- B. Proposals shall be submitted by **3:30 PM** on **4/9/2025**

(Refer to Section 00010 – Notice to Bidders for additional information and instructions regarding the date and time of submittal of Proposals.)

- C. **Bidders shall bear full responsibility for delivering Proposals to the required location by the time and date established.**

**3.03 MODIFICATION OR WITHDRAWAL OF PROPOSALS**

- A. A Proposal may not be modified, withdrawn, or cancelled by the Bidder within sixty (60) days following the time and date designated for the receipt of Proposals and the Bidder so agrees in submitting their Proposals.
- B. Prior to the time and date designated for receipt of Proposals, Proposals may be modified or withdrawn. Modifications and withdrawals shall be in writing or by telegram. If by telegram, written confirmation shall have been mailed and postmarked before the date and time set for receipt of Proposals. Telegraphic communications shall be worded so that the amounts of the original Proposals are not revealed.
- C. Withdrawn Proposals may be resubmitted up to the time and date designated for receipt of Proposals.

**3.04 BIDDERS' REPRESENTATION AND ACKNOWLEDGEMENTS**

A. In submitting their Proposal, each Bidder represents that:

1. They have read and understand the Bidding Documents.
2. Their Proposal is made in accordance with the Bidding Documents.
3. They have visited the Project Site and have familiarized themselves with the local conditions under which the Work they are bidding will be performed.
4. **They will accept the contract award, regardless of the identity of other Contractors on the Project.**
5. **During contract performance, they will not interrupt their Work nor impede the progress of other Contractors as a result of prejudice based on sex, race, color, creed, labor affiliation, or lack of labor affiliation of Contractors or employees of Contractors engaged on this Project.**

B. In submitting their Proposal each bidder acknowledges:

1. The right of the Owner to accept or reject any Proposal, to waive any informality or irregularity in any Proposal received, and to accept other than the low Bid.
2. The right of the Owner to accept any combination of Bid Divisions they desire.
3. The right of the Owner to award contracts in their own best interest.

**3.05 OTHER INFORMATION**

A. All Bidders shall comply with the requirements of the Bidding Documents, Addenda, and all applicable codes, laws, and regulations in preparing and submitting their Proposals.

B. Refer to Section 00300 – Instructions for Proposals and Bid Division Descriptions for additional information and instructions regarding Proposals.

**END OF SECTION 00100**

Divisions

**PART 1 – GENERAL**

**1.01 PROPOSAL FORMS**

- A. A separate set of Proposal Forms, Bid Division Descriptions, Drawings, Contract Conditions, Specifications, and Preliminary Milestone Schedule(s).
- B. Bidders shall use the copies of Proposal Forms included in the separate sets of Bidding Documents. Copies of the Proposal Forms are acceptable.

**1.02 BID DIVISION DESCRIPTIONS**

- A. Section 00309 contains the Bid Division Descriptions. Each Bid Division Description represents a separate, self-contained Scope of Work. Bid Divisions are the basic divisions of Work into which the Project has been divided for bidding and construction.

**PART 2 – PROPOSAL FORMAT**

**2.01 BID PROPOSALS**

- A. Bidders are required to use the Proposal Forms provided by the Owner.
- B. A complete Proposal consists of:
  - 1. **Submit 1 complete copy of your proposal on Proposal Form – Section 00305.**
  - 2. Alternate Pricing forms (if applicable to this Project).
- C. Each Proposal shall have a Bid Security in the amount of five percent (5%) attached to the proposal.
- D. All spaces provided on the Proposal Form(s) shall be filled in. If any space provided is not utilized by the Bidder, that space shall be filled in with the notation “N/A” (Not Applicable).
- E. The Proposal Form(s) shall be filled in by typewriter or printed manually in ink.
- F. Where indicated, all sums shall be expressed in words and figures.  
**In case of discrepancy, the words shall govern.**
- G. **Bidders shall not make unsolicited notations or statements on the Proposal Form(s). Alteration of the Proposal Form(s) is not permitted.**
- H. All changes to and erasures of the Bidder’s entries shall be initialed by the signer of the Proposal.
- I. Each Proposal shall include the legal name of the Bidder and a statement regarding whether the Bidder is a sole proprietor, a partnership, a corporation, or other type of legal entity. Proposals submitted by corporations shall have the state of incorporation noted, and shall have corporate seals affixed. Any Bid submitted by an agent shall have a current Power of Attorney attached, certifying the agent’s power to bind the Bidder.

**2.02 ALTERNATES**

- A. **All requested Alternates shall be bid with all lines completed or the Proposal will be considered incomplete.**

**PROPOSAL FOR MULTIPLE BID DIVISIONS**

- A. Each Bidder shall submit only one (1) Proposal for each Bid Division the Contractor is bidding. There is no limit to the number of Bid Divisions a Bidder may bid.
- B. Each Bidder is required to include a separate Bid for each Bid Division in order to be considered for contract award. Spaces are provided in the Proposal Form(s) to reference multiple Proposals.
- C. Multiple Bid Proposals shall contain separate Proposal Forms for each Bid Division being bid.
  - 1. Each Proposal Form shall be fully completed.
  - 2. The Bid for each Bid Division shall be independent of Bids for other Bid Divisions.
  - 3. Bidders shall use the "Combined Bid Deduct" section of the Proposal Form (Section 00305) to finalize multiple Bid Proposals.

**PART 3 – COMPLETION OF PROPOSAL FORMS AND SEALED BID ENVELOPE**

**3.01 PROPOSAL FOR (SECTION 00305)**

- A. Each Bid Division shall be submitted in a separate envelope, with a separate Bid Bond.
- B. Fill in the legal name of the Bidder, the address, the telephone number, fax number, contact name and contact email.
- C. Fill in the name and number of the Bid Division covered by the Proposal.
- D. Fill in the numbers and dates of all Addenda issued, received, and considered a part of the Proposal. Proposals must include acknowledgement of all Addenda issued up to the Bid Date.
- E. On the Proposal Form(s), fill in the Lump Sum Base Bid for the Bid Division. Fill in the amount in both words and figures. DO NOT include costs for Performance Bonds or Labor/Materials Payment Bond in the Base Bid amount.
- F. Fill in the cost(s) for Performance Bond(s) and Labor and Material Payment Bond(s) in the amount(s) requested (reference Section 00600), in the space(s) provided. Fill in the amount(s) in both words and figures.
- G. In the "Combined Bid Deduct" portion of the Proposal Form(s), state the amount(s) to be deducted from the total of your Base Bid should you be awarded contracts for multiple Bid Divisions. State the numbers of the Bid Divisions included in each combination, and the amount to be deducted from the total of all Base Bids in each combination.
- H. If Alternate Bid(s) have been requested, fill in the Lump Sum Bid for each Alternate Bid in the space provided. DO NOT include costs for Performance Bonds or Labor and Material Payment Bonds.
- I. Fill in the anticipated date(s) of indicated Shop Drawings and/or Sample Submittal(s) in the space(s) provided.
- J. Fill in the anticipated number of weeks needed for fabrication of indicated items, beginning on the Bid Date.
- K. Fill in the anticipated number of on-site staff.
- L. Fill in the anticipated number of days to complete the Work.
- M. Fill in the anticipated number of weeks needed for delivery of indicated items, beginning on the Bid Date.
- N. Fill in the names of the manufacturers, suppliers, and/or subcontractors of indicated items.



- O. If you choose to submit Voluntary Alternates or Value Engineering Suggestions, please summarize your suggestions and state the amount to be deducted from the Base Bid.
- P. Review the "Bid Division Responsibilities" portion of the Proposal Form.
- Q. Review the "Schedule" portion of the Proposal Form.
- R. If the Proposal includes exceptions or substitutions to any part of the Bidding Documents or the Contract Documents, state the exceptions or substitutions in writing on the Proposal Form.
- S. Fill in the Bidder's legal name.
- T. Indicate the Bidder's status as a sole proprietor, partnership, corporation, or other type of entity.
- U. Sign the Proposal Form in the space provided.
- V. Type or print the signer's name and title in the spaces provided below the signature line.
- W. Date the Proposal Form in the space provided.
- X. Provide phone number, fax number and email address on the space provided.

**3.02 SEALED BID ENVELOPE**

- A. Bids submitted must be sealed, preferably in a 9" x 12" manila envelope.
- B. Each Bid Division is to be submitted in a separate envelope.
- C. **Label the sealed bid as follows:**

<b>TO:</b>	<b>Oscoda Area Schools</b> <b>Attn: Scott Moore</b> <b>3550 E. River Rd.</b> <b>Oscoda, MI 48750</b>
	<b><u>SEALED BID FOR:</u></b>
	<b>Oscoda Area Schools 2024 Bond Program</b> <b>Community Center Rebid - General Trades, Roofing,</b> <b>Flooring &amp; Fire Protection</b>
	<b>Bid Division No: _____</b>

**END OF SECTION 00300**

**Project:** Oscoda Area Schools 2024 Bond Program  
Community Center Rebid - General Trades, Roofing, Flooring  
& Fire Protection

Submitted By: \_\_\_\_\_

(Bidder's Company Name)

Address: \_\_\_\_\_

City / State / Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Email: \_\_\_\_\_

**Bid Proposal Deadline:** Prior to **4/9/2025 at 3:30 PM (local time)** to:

Oscoda Area Schools  
Scott Moore, Superintendent,  
3550 E. River Rd.  
Oscoda, MI 48750.

Or upload to Building Connected <https://app.buildingconnected.com/login?retUrl=%2F>

**Bid Division Name:** \_\_\_\_\_

**Bid Division Number:** \_\_\_\_\_

**ADDENDA**

We (the Bidder) acknowledge receipt of the following Addenda:

- Addendum #\_\_ Dated \_\_\_\_\_
- Addendum #\_\_ Dated \_\_\_\_\_
- Addendum #\_\_ Dated \_\_\_\_\_

**BID BOND ATTACHED?**

- Yes, 5% Bid Bond is Attached**
- Certified Check/Money Order for 5% of Base Bid is Attached**

**BASE BID for Oscoda Area Schools 2024 Bond Program (not including Labor Bond, Material Bond, and/or Performance Bond Costs):**

\_\_\_\_\_ Dollars and 00/100ths

\$ \_\_\_\_\_

**BOND COST for Oscoda Area Schools 2024 Bond Program (Cost to provide Labor Bond, Material Bond, and/or Performance Bonds on Base Bid):**

\_\_\_\_\_ Dollars and 00/100ths

\$ \_\_\_\_\_ **TOTAL BID**

**COMBINED BID DEDUCT**

If awarded a contract for the Work, combining the following Bid Division(s), the corresponding amount(s) may be deducted from the Base Bid(s) of each of the involved Bid Divisions.

Bid Divisions Combined

Deduct from each Bid Division:

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**ALTERNATES**

Alt. C1: Asphalt path around Richardson Elementary School. Provide pricing to add 10 ft. asphalt path around Richardson.

\$ \_\_\_\_\_

Alt C2: Sprinklers around the Community Center. Provide pricing to add sprinklers to the areas surrounding Richardson Elementary.

\$ \_\_\_\_\_

Alt. C3: Sprinklers around the Community Center. Provide pricing to add sprinklers to the areas surrounding the community center as shown on the drawings.

\$ \_\_\_\_\_

Alt. C4: Grill Canopy Concrete Pad Expansion. Provide pricing to expand the concrete pad as shown on drawings.

\$ \_\_\_\_\_

Alt. C5: Repave small loop north of Richardson Elementary School. Provide pricing to repave path.

\$ \_\_\_\_\_

Alt. C6: Repave large loop in front of Richardson Elementary School. Provide pricing to repave large loop.

\$ \_\_\_\_\_

Alt. A1: Grill Canopy. Provide pricing to add grill canopy and half height walls as shown on Drawings.

\$ \_\_\_\_\_

Alt. A2: Wall Padding in Fieldhouse. Provide pricing to add wall padding to all faces of the field house and along supplementary rooms as shown on the drawings.

\$ \_\_\_\_\_

**SUBMITTALS**

Anticipated Date of Shop Drawing Submittal at Post Bid Interview: \_\_\_\_\_

Anticipated Number of Days to Begin: \_\_\_\_\_

Anticipated Number of On-site Staff: \_\_\_\_\_

Anticipated Number of Days to Complete: \_\_\_\_\_

Anticipated Number of Days for Delivery of Needed Items: \_\_\_\_\_

Proposed Manufacturers, Suppliers, and/or Subcontractors:

<u>Item(s)</u>	<u>Manufacturer/Subcontractor/Supplier</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**VOLUNTARY ALTERNATES / VALUE ENGINEERING SUGGESTIONS**

We suggest the following alternate procedure(s) and/or material(s):

<u>Summary of Suggestions</u>	<u>Deduct from Base Bid</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**BID DIVISION RESPONSIBILITY**

We recognize that the Scope of Work within a Bid Division represents a construction segment that is not necessarily restricted to a single construction trade, and our Proposal includes work of all trades required to fully and successfully complete all of the Work required in the Bid Division(s) we have submitted Proposals for:

**SCHEDULE**

We have reviewed the Preliminary Milestone Schedule and hereby endorse it with regard to the Work of Bid Division(s) we have bid. ALL WORK MUST BE COMPLETED BY **2/13/2026**.

**EXCEPTIONS AND/OR SUBSTITUTIONS**

We have submitted our Proposal, as specified, complete and in accordance with the Bidding Documents, including Addenda and the Contract Documents, without exceptions or substitutions, unless otherwise noted in the "Voluntary Alternate / Value Engineering Suggestions" portion of this Proposal Form.

**EXECUTION**

Name of Bidder: \_\_\_\_\_

Bidder's Status:

Corporation;  Partnership;  Sole Proprietor;  Other: (Please Specify: \_\_\_\_\_)

By/Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

END OF SECTION 00305

**Familial Relationship Sworn Statement**

\_\_\_\_\_ does hereby disclose that per MCL 380.1267:  
Company Name

**YES**, There exists a familial relationship between the Owner of the project or any member of their Board, or Board of Directors, or the Superintendent of the School district, intermediate superintendent of the intermediate school district, or chief executive officer of the public-school academy and the Owner or an employee(s) of \_\_\_\_\_.  
Company Name

Disclosure Between:

Name \_\_\_\_\_ AND Name \_\_\_\_\_

Title: \_\_\_\_\_ Title: \_\_\_\_\_

Relationship: \_\_\_\_\_ Relationship: \_\_\_\_\_

**NO**, There does not exist a familial relationship between the Owner of the project or any member of their Board, or Board of Directors, or the Superintendent of the School district, intermediate superintendent of the intermediate school district, or chief executive officer of the public school academy and the Owner or an employee(s) of \_\_\_\_\_.  
Company Name

Name (printed): \_\_\_\_\_

Position: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Notary Public(printed): \_\_\_\_\_

Signature: \_\_\_\_\_

County: \_\_\_\_\_

Date: \_\_\_\_\_ My Commission Expires: \_\_\_\_\_

Affix Notary Seal Here:



**END OF SECTION 00306**

## Iran Business Relationship Affidavit

Effective April 1, 2013 all bids, proposals, and/or qualification statements received in the State of Michigan must comply with the "Iran Economic Sanctions Act". The following certification is to be signed and included at time of submittal.

### CERTIFICATION

Pursuant to the Michigan Iran Economic Sanctions Act, 2012 P.A. 517, by submitting a bid, proposal or response, Respondent certifies, under civil penalty for false certification, that it is fully eligible to do so under law and that it is not an "Iran linked business," as that term is defined in the Act.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date

**IRAN ECONOMIC SANCTIONS ACT**  
**Act 517 of 2012**

AN ACT to prohibit persons who have certain economic relationships with Iran from submitting bids on requests for proposals with this state, political subdivisions of this state, and other public entities; to require bidders for certain public contracts to submit certification of eligibility with the bid; to require reports; and to provide for sanctions for false certification.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

*The People of the State of Michigan enact:*

**129.311 Short title.**

Sec. 1. This act shall be known and may be cited as the "Iran economic sanctions act".

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**129.312 Definitions.**

Sec. 2. As used in this act:

(a) "Energy sector of Iran" means activities to develop petroleum or natural gas resources or nuclear power in Iran.

(b) "Investment" means 1 or more of the following:

(i) A commitment or contribution of funds or property.

(ii) A loan or other extension of credit.

(iii) The entry into or renewal of a contract for goods or services.

(c) "Investment activity" means 1 or more of the following:

(i) A person who has an investment of \$20,000,000.00 or more in the energy sector of Iran.

(ii) A financial institution that extends \$20,000,000.00 or more in credit to another person, for 45 days or more, if that person will use the credit for investment in the energy sector of Iran.

(d) "Iran" means any agency or instrumentality of Iran.

(e) "Iran linked business" means either of the following:

(i) A person engaging in investment activities in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran.

(ii) A financial institution that extends credit to another person, if that person will use the credit to engage in investment activities in the energy sector of Iran.

(f) "Person" means any of the following:

(i) An individual, corporation, company, limited liability company, business association, partnership, society, trust, or any other nongovernmental entity, organization, or group.

(ii) Any governmental entity or instrumentality of a government, including a multilateral development institution, as defined in section 1701(c)(3) of the international financial institutional act, 22 USC 262r(c)(3).

(iii) Any successor, subunit, parent company, or subsidiary of, or company under common ownership or control with, any entity described in subparagraph (i) or (ii).

(g) "Public entity" means this state or an agency or authority of this state, school district, community college district, intermediate school district, city, village, township, county, public authority, or public airport authority.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**129.313 Ineligibility of Iran linked business to submit request for proposal bid; certification.**

Sec. 3. (1) Beginning April 1, 2013, an Iran linked business is not eligible to submit a bid on a request for proposal with a public entity.

(2) Beginning April 1, 2013, a public entity shall require a person that submits a bid on a request for proposal with the public entity to certify that it is not an Iran linked business.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**129.314 Effect of false certification.**

Sec. 4. If a public entity determines, using credible information available to the public, that a person has submitted a false certification under section 3(2), the public entity shall provide the person with written notice of its determination and of the intent not to enter into or renew a contract with the person. The notice shall include information on how to contest the determination and specify that the person may become eligible for a



future contract with the public entity if the person ceases the activities that cause it to be an Iran linked business. The person shall have 90 days following receipt of the notice to respond in writing and to demonstrate that the determination of false certification was made in error. If a person does not make that demonstration within 90 days after receipt of the notice, the public entity may terminate any existing contract and shall report the name of the person to the attorney general together with information supporting the determination.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**129.315 Civil action; penalty.**

Sec. 5. The attorney general may bring a civil action against any person reported under section 4. If a civil action results in a finding that the person submitted a false certification, the person is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the public entity's investigation, and reasonable attorney fees, in addition to the fine. A person who submitted a false certification shall be ineligible to bid on a request for proposal for 3 years from the date the public entity determines that the person has submitted the false certification.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**129.316 Conditional effect.**

Sec. 6. The provisions of this act are effective only if Iran is a state sponsor of terror as defined under section 2 of the divestment from terror act, 2008 PA 234, MCL 129.292.

**History:** 2012, Act 517, Eff. Apr. 1, 2013.

**END OF SECTION 00307**

**Bid Division: 060000 – General Trades**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 012300 - Alternates  
Section 061000 – Rough Carpentry  
Section 061600 – Sheathing  
Section 062000 – Finish Carpentry  
Section 068316 – Fiberglass Reinforced Paneling  
Section 074210 – Cladding Support Systems  
Section 074213.23 – Metal Composite Material Wall Panels  
Section 080671 – Door Hardware Schedule  
Section 081113 – Hollow Metal Doors and Frames  
Section 081416 – Flush Wood Doors  
Section 081700 – Integrated Door Opening Assemblies  
Section 083313 – Coiling Counter Doors  
Section 083323 – Overhead Coiling Doors  
Section 083326 – Overhead Coiling Grilles  
Section 087100 – Door Hardware  
Section 101400 – Signage  
Section 102113.19 – Solid Plastic Toilet Compartments  
Section 102600 – Wall and Door Protection  
Section 102800 – Toilet, Bath, and Laundry Accessories  
Section 104300 – Emergency Aid Specialties  
Section 104400 – Fire Protection Specialties  
Section 122400 – Roller Window Shades

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants (As it relates to work in this Bid Division)  
Section 080671 – Door Hardware Schedule (As it relates to this bid division)  
Section 081700 – Integrated Door Opening Assemblies. (As it relates to this bid division.)  
Section 083113 – Access Doors and Frames (As it relates to access panels installed in masonry)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

All required nailers, fasteners, blocking, etc for a complete operational system.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.

**Wolgast Corporation – Construction Management**

**Bid Division: 060000 – General Trades**

5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division's work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner's dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Unloading, protection and record of all hollow metal doors and frames.
2. All wood nailers for roof blocking, fascia, masonry, etc.
3. Wood blocking around windows and doors.
4. All temporary shoring as required for work in this Bid Division.
5. Provide, receive, store, protect, inventory, and install all described bid items.
6. Submittal of required product data and shop drawings within 20-days of Construction Contract or Owner's Letter of Intent.
7. Provide for proper legal off-site disposal off all construction debris generated by the described work.
8. Sufficient numbers of shop drawings are to be provided to the affected contractors (i.e. mason, electrician, etc.)
9. Install all doorframes, and coordinate with mason contractor.
10. Cover all countertops with double layered corrugated cardboard.
11. Clean, prep and adjust all equipment immediately prior to Owner occupancy.
12. Furnish and install all joint sealants as indicated in specifications and drawings including but not limited to perimeter joints of doors and louvers at interior and exterior, perimeter joints between interior wall surfaces and frames of interior doors and all other joints indicated.
13. Contractor shall broom sweep building daily.

**Bid Division: 060000 – General Trades**

14. Contractor shall furnish and install temporary insulated weather-tight closures of openings created as a result of the work in this scope in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and for building security. Provide doors with self-closing hardware and locks.
15. Provide all wood framing, plywood and nailers as shown and specified.
16. Review alternates.
17. Provide all wood blocking in metal stud walls for all materials that will require it, including but not limited to, casework, fixtures, toilet accessories, coat racks, signage, curtains, marker & tack boards, etc.
18. The contractor shall engage an authorized factory service representative to perform a start-up service prior to the acceptance of the doors by the owner and construction manager. The start-up service certification shall include: verification of correct motor wiring and voltage; adjusting the door for proper operation; testing, adjusting and correcting the door controls and safeties; testing the door for proper function as required by the architect's specifications; the formal training of the owner and owner's representatives for the proper operation and maintenance of the door. The authorized factory service representative shall provide a written certification with the request for final payment stating that the start-up service has been performed and that each of the above items have been verified for proper operation.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Furnish all bathroom accessories that are not indicated to be supplied by the owner. This contractor is responsible for installing all bathroom accessories including those items furnished by this contractor and the owner.
3. Furnish and install all blocking and sheathing as required, including fire-rated and treated as documented. This includes all roof Blocking / Nailers, as indicated in the wall details and specifications.
4. Furnish and install all hollow metal frames, doors, and finish hardware. This contractor will complete the initial installation and bracing of all hollow metal frames.
5. When installing door frames, this contractor must consider floor thickness and install accordingly to ensure doors do not rub on floors.
6. Provide and install all signage.
7. Provide and install flashing as required.
8. Provide and install all exterior metal panels including blocking for lights, horns, cameras, etc.
9. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
10. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
11. Mandatory attendance at all required pre-installation meetings.
12. Mandatory attendance for all weekly construction meetings.
13. **This contractor to include an allowance of 120 worker hours for cleaning of the work areas during the project and prior to turnover to the owner, in the base bid. Include the hourly rate used to calculate this allowance. This allowance is to be used at the discretion of and scheduled by the construction manager. Time and material invoices for this work shall be managed and approved daily by the field manager. This allowance must be included by line item in the schedule of values. Any remaining balance at the completion will be credited to the owner.**
14. Provide all labor, materials, and equipment necessary to furnish and install wall framing for the administrative office, including but not limited to metal studs, blocking, sheathing, and all required bracing to ensure structural integrity and compliance with project specifications.

**Bid Division: 060000 – General Trades**

**Excludes:**

1. Hardware for aluminum entries.
2. Aluminum frames
3. FRP Doors and Hardware.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 060000**

**Bid Division: 075000 – Roofing**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 074113 – Metal Roof Panels  
Section 076200 – Sheet Metal Flashing and Trim

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants (As it relates to this bid division)  
Section 079513 – Expansion Joint Cover Assemblies. (As it relates to this bid division.)  
Section 133419 – PEMB 2.6 Components & 2.9 Gutter & Downspouts (Specific to Snow Guard)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Fasteners, sealants, flashing, etc., for a complete weather & water tight system.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.

**Wolgast Corporation – Construction Management**

**Bid Division: 075000 – Roofing**

15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Installation of roof edging.
2. Cut and tie back into where office building roofing and PEMB building meet includes flashing.
3. Maintain weather protection during tie-in.
4. Furnish and install all joint sealants as indicated in specifications and drawings.
5. Responsible for all roof trim.
6. Supply and install all required fasteners.
7. Coordinate all finishing connections with appropriate contractors.
8. Coordinate all roof penetrations with appropriate contractors, flash and seal. (Please review roof plans, mechanical plans, and electrical plans.)

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Provide complete, weather-tight protection of each roof location at the completion of each day's work or as required during the workday. Cost to replace all water-damaged materials in the buildings due to the lack of proper protection, will be the responsibility of this Bid Division.
3. Furnish and install all materials for a complete installation, including all insulation, and top of wall flashings as documented.
4. Tie-in all roof drains to achieve proper flashing and drainage.
5. Provide and install Snow/Ice Guard for the office building as shown on A1.12.
6. Provide all required flashing work for a permanent, weather-tight condition at existing roofing for roof-mounted equipment as documented. Provide all required wood to extend mechanical curbs to achieve minimum height requirements per roof manufacturer's guidelines. Coordinate with mechanical and electrical contractors for removal and reinstallation of existing roof-mounted equipment and new equipment as required for the proper installation of the flashing. Provide all required termination bars and sealants for a permanent, weather-tight condition as documented.
7. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
8. Mandatory attendance at all required pre-installation meetings.
9. Mandatory attendance for all weekly construction meetings.
10. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
11. Is this contractor responsible for the gutter and downspouts on the Administration Office.

**Bid Division: 075000 – Roofing**

**Excludes:**

1. The Snow/Ice Guard for the PEMB is by PEMB Contractor.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above-mentioned work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 075000**



**Bid Division: 096500 – Flooring**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 033511 – Concrete Floor Finishes  
Section 093000 – Tiling  
Section 096500 – Resilient Flooring  
Section 096513 – Resilient Base and Accessories  
Section 096566 – Resilient Athletic Flooring

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079513 – Expansion Joint Cover Assemblies. (As it relates to this bid division.)  
Section 079200 – Joint Sealants (As it relates to work in this Bid Division)  
Section 090561 – Common Work Results for Flooring Preparation

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

All adhesives, base, sealants, etc.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications, including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. The contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.

**Wolgast Corporation – Construction Management**

**Bid Division: 096500 – Flooring**

12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Preparation of areas to receive new flooring, install as shown and specified. (Prep is this Bid Division's responsibility.)
2. Strip, clean and finish all floors immediately prior to the Owner's occupancy.
3. Transition strips from new VCT to existing or new ceramic and/or carpet, and/or terrazzo.
4. Expansion and control joints as required by design and/or product manufacturer.
5. Follow finish schedule.
6. Provide all floor striping and graphics, if required.
7. Vacuum and spot clean carpet prior to Owner occupancy.
8. Provide and install all required base.
9. Transition and provider stripes.
10. Furnish and install all caulking required for the work of this Bid Division.
11. Provide Owner with additional flooring for each type, color, pattern and size installed. (Per specifications)
12. Replacement and/or repair of defective and/or misaligned material installed by this contractor.
13. To repair any adjacent material damaged in the execution of the above listed work.
14. All adhesives.
15. Provide and install thresholds as required.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award
3. Finish and install Sport Floor complete with court markings as shown on drawings.
4. Polished and Sealed Concrete is to be completed by this contractor – Refer to drawing A7.21
5. Mandatory attendance at all required pre-installation meetings.
6. Mandatory attendance for all weekly construction meetings.
7. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.

**Bid Division: 096500 – Flooring**

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**BID OF BID DIVISION 096500**

**Bid Division: 210000 – Fire Suppression**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 210500 – Common Work Results for Fire Suppression  
Section 210523 – General-Duty Valves for Water-Based Fire Suppression Piping  
Section 211300 – Fire-Suppression Sprinkler Systems

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants  
Section 083100 – Access Doors and Panels (As required by this bid division.)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Operational Wet Based Fire Suppression System

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.

**Wolgast Corporation – Construction Management**

**Bid Division: 210000 – Fire Suppression**

14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Perform all connections between site utilities and building, coordinate with site contractor on utilities.
2. Provide proper repair of all ceilings, walls, floors, etc., when installing new piping and hangers.
3. Provide shop drawings to State Fire Marshall for Plan Review (allowing sufficient time for changes that may be made and must be completed prior to beneficial occupancy).
4. Perform all excavating, backfill, and compaction required for the work of this bid division.
5. Remove debris generated from your scope of work from site.
6. Provide all required layout and verify that no conflict occurs with other trades.
7. Furnish operating and maintenance manuals.
8. Provide record and as-built drawings.
9. Provide all permits required in bid proposal and coordinate all required inspections. Provide copies of final inspection approvals.
10. Provide all required work to prepare each piece of equipment to receive and allow for proper installation and operation of the temperature control modules and related automatic temperature control devices.
11. Provide temporary water distribution as required.
12. Provide all State Certified drawings.
13. Contractor shall coordinate phased delivery of all pre-purchased equipment with supplier.
14. Remove, clean and reinstall all existing grids, vents, registers and diffusers including those mounted in metal ceiling grid systems.
15. Provide start-up training with Owner Representative, Architect and Construction Manager for all equipment installed.
16. Final installation and all work by this bid division must comply with governing building and life safety codes.
17. Sprinkler heads are required to hit center of ceiling tile.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Include cost for all required permits in bid proposal and coordinate all required inspections.
3. Provide and install spare sprinkler box and wrench with minimum of 6 sprinklers of each type installed.
4. Provide the installation of a fire protection system to meet all required governing requirements.
5. Furnish all access panels as required for the installation of the bid division's work.
6. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award
7. Mandatory attendance at all required pre-installation meetings.
8. Mandatory attendance for all weekly construction meetings.
9. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.

**Wolgast Corporation – Construction Management**

**Bid Division: 210000 – Fire Suppression**

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 210000**

**Bid Division:** 030100 – Concrete **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 012300 - Alternates  
Section 031000 – Concrete Forming and Accessories  
Section 032000 – Concrete Reinforcing  
Section 033000 – Cast-In-Place Concrete  
Section 321313 – Concrete Paving  
Section 321314 – Concrete Sidewalk, Sidewalk Ramps and Driveways  
Section 321613 – Concrete Curbs and Gutters

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 072100 – Thermal Insulation (As it relates to building insulation under slab and interior of foundation walls)  
Section 079200 – Joint Sealants  
Section 3123165 – Excavation (As it relates to fine grading, final compaction & footing and foundation excavation and backfill)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Sidewalks, curbs, floor slabs, grouting base plates, fine grading, foundations, footing excavation, and backfill, etc. Saw cutting of concrete and slab insulation.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the

**Bid Division: 030100 – Concrete** For records only, not for bidding purposes

work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.

11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Removal of excess spoils generated by this bid division from site.
2. Grout under steel column base plates.
3. Provide dewatering as needed for work in this Bid Division, if required.
4. No concrete is to be installed until acceptable density testing has been verified. Any concrete installed without density verification will become the sole responsibility of the Contractor and may be required to be replaced at the Contractor's expense.
5. Mechanical and electrical housekeeping pads.
6. Install all miscellaneous embedded items supplied by others (i.e. anchor bolts, bumper posts, inserts).
7. Coordination with electrician on installation of the under-floor raceway and boxes.
8. Finish grade of all sand or other fill cushion under interior and exterior slabs on grade, walks, pads, or aprons.
9. Provide temporary weather protection as needed, including temporary enclosures, temporary heat and temporary heating fuel, concrete additives and accelerators as required.
10. All exterior concrete. (Including, but not limited to sidewalks, curbs, trash corral pad, footings, chiller pad, etc.)
11. This contractor is responsible for compaction at footing bottoms.
12. Furnish and install foundation and under slab insulation.
13. Provide excavation and backfill of footings.
14. Patch all concrete floors as shown on Demolition drawings.
15. Provide all thickened slabs.
16. Excavate and backfill all interior footings.
17. All interior concrete slabs, walks and pads must be finished to a levelness tolerance of a maximum ¼" in ten (10') feet unless specifically stated other wise by the construction documents.
18. Contractor must provide written certification by an independent testing agency of all slabs, walk and pad level tolerances. Certification to be established using a five (5') foot grid.
19. Provide written acceptance of grade elevations to Construction Manager after Site Work contractor has established the building pad.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.



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bidding purposes

2. Furnish and install all required exterior and interior concrete work.
3. Perform all excavating, backfill, and compaction required for footings and foundations.
4. Furnish and install all horizontal and vertical rigid insulation below slabs.
5. Provide reinforcing steel shop drawings and mix designs with the first submittals.
6. Provide all concrete footings and foundation walls.
7. Furnish and install all concrete at supported slabs, including installation of metal deck furnished by others where noted.
8. Provide all strip footings as required.
9. Furnish and install steel reinforcement embedded in concrete as indicated.
10. Pour thickened slabs as indicated.
11. Furnish and install all required vapor barriers, expansion joint materials and all interior and exterior joint sealants as it pertains to concrete work.
12. Furnish and install all required dowels at new to existing concrete slabs, sidewalks, curbs, footings, foundations, etc.
13. Coordinate with Bid Division 220000, 230000 and 260000 contractors prior to installation of all floor drains, housekeeping pads, and floor boxes.
14. Mandatory attendance at all required pre-installation meetings.
15. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
16. Verify with the construction manager that required inspections have been completed, prior to pouring concrete. Any contractor that pours concrete without verification of the required inspections, may be subject to removal and replacement of that concrete, at the building officials' discretion.

**Excludes:**

1. Concrete Testing
2. Floor patching for mechanical and electrical trades, beyond what is required on the demolition drawings.
3. Demolition of exterior concrete surfaces by Bid Division 024200.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

END OF BID DIVISION 030100

**Bid Division:** 040000 – Masonry **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 042000 – Unit Masonry  
Section 042200 – Concrete Unit Masonry

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 072100 – Thermal Insulation  
Section 072726 – Fluid-Applied Membrane Air Barriers (As it relates to this bid division)  
Section 079200 – Joint Sealants (Exterior control joints)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Mortar, block, brick, scaffolding, shoring, toothing of existing masonry, installing of embedded items, caulking, reinforcing, etc.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.

**Bid Division:**           **040000 – Masonry**           **For records only, not for  
bidding purposes**

12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Caulking of all exterior control joints.
2. Temporary weather protection as needed, including temporary enclosures, temporary heat, temporary heating fuel. Mason to heat sand water & mixture.
3. Installation of miscellaneous steel lintels.
4. Installation of bolts and grouted anchors.
5. Coordinate the location of all masonry openings and penetrations with the trade requiring same.
6. Coordinate masonry opening sizes and locations with all contractors.
7. Layout for opening for other trades to be performed by that trade.
8. Verify correct window rough opening sizes for all new and relocated existing window units prior to building masonry window openings.
9. Provide all required masonry sealants and caulking for wall flashing, weep holes, and rigid insulation.
10. Provide patching of all wall penetrations as required.
11. Grout all jambs and headers of all hollow metal frames, and brass doorjambs per manufacturer's recommendation.
12. The brick is the responsibility of the masonry contractor, to purchase and install.
13. Removal of mortar from floors, clean with cleaner and water to remove excess mortar and mortar dust.
14. Cavity wall insulation includes all insulation extending beyond the top of the brick or veneer line but laying against the CMU wall as specified.
15. Provide through wall flashing at building tie-ins.
16. Temporarily brace masonry as required by industry standards and MIOSHA, to include temporary warning signage and barricades.
17. Samples of brick for exterior walls will be tested for efflorescence per ASTM C67 prior to acceptance of brick.
18. In the event that efflorescence appears after walls are in place, the Architect shall select samples of brick and mortar taken directly from the wall to be tested for chemical content. If efflorescence producing materials are found in the brick or mortar in amounts exceeding the limits called for by this specification and referenced in the ASTM standards, the contractor shall bear the cost of the testing and all remedial, additional or replacement work. If efflorescence producing materials in both the brick and the mortar do not exceed the limits as stated above, the cost of the testing and patching of the areas where samples were removed shall be borne by the Owner.
19. Install access doors in masonry.

**Bid Division:** 040000 – Masonry **For records only, not for bidding purposes**  
**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Furnish and install all required masonry materials.
3. This bid division must provide their own dumpster for their work or remove the masonry debris by truck throughout the course of the masonry work.
4. Rub walls smooth.
5. Furnish and install bullnose CMU at locations as documented.
6. Furnish and install all required cavity wall insulation and rigid insulation against masonry construction, as documented.
7. Provide all required grouting of all hollow metal frames in masonry work.
8. Bid division 060000 will complete the initial installation and bracing of all hollow metal frames. **The masonry contractor is responsible for maintaining level and square door frames during the masonry installation.** Any additional cost incurred by another bid division contractor, to correct a frame that is not level and square due to lack of proper installation, will be the responsibility of this contractor.
9. Provide all caulking of all exterior control joints. The first joint caulked must be approved by the Construction Manager to set the level of acceptance for all caulking. All unsatisfactory caulking will be required to be removed and re-installed. Confirm color of exterior caulking with the Architect prior to installation.
10. Furnish and install all required masonry for interior and exterior columns.
11. Construct a sample brick masonry wall for owner approval prior to any brick installation. Refer to specifications.

**Excludes:**

1. Foundation perimeter interior slab insulation.
2. Steel doorframes to be provided and initially installed by Bid Division 060000.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

END OF BID DIVISION 040000

**Bid Division:** 050000 – Metals **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 051200 – Structural Steel Framing  
Section 052100 – Steel Joist Framing  
Section 053100 – Steel Decking  
Section 055000 – Metal Fabrications  
Section 074213.23 – Metal Composite Material Wall Panels

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 033000 – Cast-in- Place Concrete (Provide steel to be embedded in concrete)  
Section 042200 – Concrete Unit Masonry (Provide steel to be embedded in masonry)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Welding, structural steel, stud joists, shoring, decking, etc., for complete operational system.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.

**Bid Division:**               **050000 – Metals**       **For records only, not for  
bidding purposes**

12. Provide all layout and measurements required to perform the work of this Bid Division.
13. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Furnish and install roof sump pans.
2. Supply all anchor bolts to installing contractors.
3. Provide all metal fabrications to be installed by Bid Division 030100/040000, including anchor bolts and imbeds.
4. Maintain cleanliness of steel until erected.
5. Clean any dirt or debris from steel in a condition ready to receive paint and acceptable by painting contractor.
6. Provide all steel angle or beam lintels for all required masonry penetrations over 24" wide in addition to any listed in lintel and beam schedules.
7. Provide all special inspections required per specifications.
8. This Contractor is responsible to follow all MIOSHA standards, including, but not limited to the Revised Part 26 of the MIOSHA standard, all fall protection, site-specific planning meetings, etc.
9. Provide all perimeter roof angles.
10. Provide and install all miscellaneous steel for roof curbs and roof draining and RTU.
11. Prime all weldings with primer.
12. Furnish & Install bridging, fasteners, and the accessories for a complete installation.
13. Furnish bearing plates, sleeves and guard posts for installation by others.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Coordinate steel per window and door details.
3. Follow all structural details for steel.
4. Furnish and install all required structural and miscellaneous steel.
5. Furnish all required metal deck at supported slabs, to be installed by concrete contractor.
6. Furnish and install all bar joists and deck.
7. Furnish and install all steel angles at the roof.
8. Furnish and install all steel angles at roof top units as indicated.
9. Furnish and install all steel angles for supporting metal decking.
10. Furnish and install all steel angles for concrete pour stops.
11. Furnish all steel lintels for installation in masonry-by-masonry contractor.
12. Furnish and install all required roof opening frames.
13. Furnish and install all required reinforcing of existing roof steel framing.

**Bid Division:**            **050000 – Metals**    **For records only, not for  
bidding purposes**

14. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
15. Mandatory attendance at all required pre-installation meetings.
16. Mandatory attendance for all weekly construction meetings
17. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.

**Excludes:**

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 050000**

**Bid Division:** 084000 – Glass & Glazing **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 084113 – Aluminum-Framed Entrances and Storefronts  
Section 084126 – All-Glass Entrances and Storefronts  
Section 088000 – Glazing

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 072726 – Fluid-Applied Membrane Air Barriers (As it relates to this bid division)  
Section 079200 – Joint Sealants (As it relates to this Bid Division)  
Section 079513 – Expansion Joint Cover Assemblies. (As it relates to this bid division.)  
Section 080671 – Door Hardware Schedule (As it relates to this Bid Division)  
Section 081700 – Integrated Door Opening Assemblies. (As it relates to this bid division.)  
Section 087100 – Door Hardware (As it relates to this Bid Division)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Joint sealants; finish hardware, glass, screens and fasteners, for a complete operational system.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.



**Bid Division: 084000 – Glass & Glazing** For records only, not for bidding purposes

12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Provide and install all hardware required for this Bid Division.
2. Field measures all openings to verify size, square, and plumb of opening.
3. Make certain all aluminum entrances conform to the Americans with Disabilities Act (as required).
4. Supply and install all glass in wood doors, hollow metal doors, frames, entrances, safety plate glass, etc.
5. Final cleaning of all installed doors. (Prior to punchlist).
6. Furnish and install all caulking and sealing associates with the work of this Bid Division.
7. Supply and install window hardware and screens (as required).
8. Completely clean all windows, frames and glass prior to occupancy.
9. Provide all shop drawings and field verification of dimensions as required.
10. All entrances, windows, doors, and frames are to conform all Fire Safety Codes.
11. Mandatory attendance at all required pre-installation meetings.
12. Mandatory attendance for all weekly construction meetings.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
1. Must be able to furnish and install all doors, windows, framing, hardware, etc., per the milestone schedules.
2. Furnish and install all aluminum storefront, frames, windows, doors and all associated window and door hardware associated with FRP /Aluminum Hybrid doors and windows.
3. Provide pull ropes in door frames for access control wiring installation. Consult with construction manager and access control contractor prior to installation.
4. When installing door frames, this contractor must consider floor finish thickness such as ceramic tile and install accordingly to ensure doors do not rub on floors.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required

**END OF BID DIVISION 084000**

**Wolgast Corporation – Construction Management**

**Bid Division:** 091000 – Drywall, Insulation & Acoustical For records only, not for bidding purposes

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 072100 – Thermal Insulation  
Section 092216 – Non-Structural Metal Framing  
Section 092900 – Gypsum Board  
Section 095113 – Acoustical Panel Ceilings  
Section 098430 – Sound-Absorbing Wall and Ceiling Units

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 072100 – Thermal Insulation (Excludes below concrete insulation)  
Section 079200 – Joint Sealants (Miscellaneous caulking, control joints, etc.)  
Section 079513 – Expansion Joint Cover Assemblies. (As it relates to this bid division.)  
Section 083100 – Access Doors and Panels (Installation of access panels in drywall or acoustical walls or ceilings. Access doors and panels to be provided by other trades.)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

All required hangers, fasteners, nailers, etc.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.

**Bid Division: 091000 – Drywall, Insulation & Acoustical** For records only, not for bidding purposes

10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Divisions Inclusions:**

1. All metal stud framing and drywall for bulkheads and light covers.
2. All building insulation except for that specifically defined in bid division 030100, 040000, and 075000.
3. Supply and install drywall and metal framing as design and specified.
4. Supply and install all gypsum board, studs and insulation as indicated.
5. Supply and install all bulkheads.
6. Coordination with mechanical and electrical trades on layout of ceiling grid.
7. Provide Owner with the amount specified of each type of ceiling tile, suspension system, and wall panels, upon completion.
8. Expansion and control joints as required by design or product manufacturer.
9. Prior to layout of ceilings, contractors accept humidity and temperature levels in the building.
10. Provide all drywall and plaster on metal as well as wood as indicated.
11. The on-site foreman for this Bid Division must be able to communicate with all employees and the Construction Manager's staff.
12. Follow room finish schedule.
13. Provide all vapor barriers as required by design and product manufacturers.
14. Provide all nailers and underlayment.
15. Provide all trim as it relates to Acoustical Ceiling System.
16. Provide all fasteners.
17. Furnish and install all caulking as required for the work of this Bid Division.
18. Replacement and/or repair of defective and/or misaligned material installed by this contractor.
19. To repair any adjacent material damaged in the execution of the above listed work.
20. Provide smooth transition from existing work to new work.
21. Install louvers and access panels furnished by each architectural, mechanical and electrical contractor in locations encased in this contractor's work.
22. Provide all caulking and sealants for plasterwork or drywall as required.

**Bid Division:** 091000 – Drywall, Insulation & Acoustical **For records only, not for bidding purposes**

23. All gypsum board walls, gypsum board wall systems, gypsum board ceilings and/or gypsum board ceiling systems must be constructed with expansion joints at a maximum spacing of 30'-0" on-center in both directions as manufactured by the gypsum board manufacturer regardless of all other specification requirements.
24. Mandatory attendance at all required pre-installation meetings.
25. Mandatory attendance for all weekly construction meetings.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Furnish and install all required light-gage metal framing material and drywall, glass mat sheathing, etc. at all walls, ceilings, bulkheads, parapets, etc.
3. Provide all metal framing, drywall and insulation at all walls, including up to the roof deck at locations as documented.
4. Furnish and install all the metal framing at the entrance canopies.
5. Provide and install all sound absorbing wall and ceiling units.
6. Furnish and install all acoustic ceiling systems, as documented.
7. Furnish and install all materials for the bulkheads as documented.
8. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
9. Mandatory attendance at all required pre-installation meetings.
10. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.

**Excludes:**

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 091000**

**Bid Division:** 099000 – Painting For records only, not for bidding purposes

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 099113 – Exterior Painting  
Section 099123 – Interior Painting

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 072726 – Fluid-Applied Membrane Air Barriers (As it relates to this bid division)  
Section 079200 – Joint Sealants (Interior Control Joints and all dissimilar products)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

All painting of doors, frames, CMU walls, drywall, access panels, caulking and sealing of interior control joints, expansion joints and imperfections on finish surfaces.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.

**Bid Division:**               **099000 – Painting**               **For records only, not for  
bidding purposes**

13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Finishing of wood casings and trim.
2. Follow room finish and door schedules.
3. Painting of all electrical and mechanical lines and equipment (as specified).
4. Paint all bulkheads.
5. Paint exposed structural components as specified.
6. Provide one (1) gallon of each color used (in unopened cans) to Owner at completion of Project.
7. Remove all foreign items and substances on existing surfaces (including, but not limited to, nails, hangers, tape, screws, etc.) and patch prior to painting.
8. All surfaces to be painted, including but not limited to drywall and masonry, are to be inspected and accepted by this contractor prior to application of paint. Surface imperfections not repaired prior to painting or submitted to the construction manager in writing as existing defects prior to painting, will be repaired by the painting contractor at no additional cost.
9. Painting Contractor is responsible for removing or protecting all cover plates, trim and other pre-finished surfaces necessary for the completion of this work scope. This Contractor is responsible for replacing anything removed upon completion of work.
10. Provide final cleaning of work prior to Owner occupancy.
11. Furnish and install all caulking required for the work of this Bid Division.
12. To repair any adjacent material damaged in the execution of the above listed work.
13. All caulking of interior control joints
14. All caulking of interior joints between all dissimilar surfaces including door and window frames, CMU & Drywall.
15. Clean, dust and dirt off bar joist, deck and ductwork prior to painting.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. All surfaces to be painted, including but not limited to drywall, steel and masonry are to be inspected and accepted by this contractor prior to application of paint. Surface imperfections not repaired prior to painting or submitted to the Construction Manager in writing as existing defects prior to painting, will be repaired by the painting contractor at no additional cost.
3. Paint all gas lines as documented.
4. Provide complete prep and painting of exposed steel materials as documented.
5. Prep and paint all exposed roof framing, duct work, conduits and any other materials as documented.
6. Paint all exposed drywall and CMU as documented.
7. Paint all hollow metal frames and doors as documented.
8. Paint all bulkheads.

**Wolgast Corporation – Construction Management**

**Bid Division: 099000 – Painting**

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bidding purposes**

9. Paint access panels to match wall or ceiling.
10. Provide and install Vinyl Graphic as indicated in the drawings and specifications.
11. This contractor to stencil paint or install signs / stickers indicating firewalls above ceilings per code. See fire safety plan for firewall locations and ratings.
12. Provide all caulking of interior control joints in masonry, drywall, and drywall to dissimilar materials and inside masonry corners.
13. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
14. Mandatory attendance at all required pre-installation meetings.
15. Mandatory attendance for all weekly construction meetings.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 099000**



**Bid Division:** 105100 –Lockers

For records only, not for  
bidding purposes

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 105129 – Phenolic Lockers

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealant (as it relates to work in this bid division)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, performance labor and material bonds as required, and schedule of values, within (2) two weeks of contract award.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.



**Bid Division: 105100 –Lockers** For records only, not for  
bidding purposes

17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Clean, prep, and adjust all equipment immediately prior to Owner occupancy.
2. Protection of floor during installation.
3. Field verify measurements before installation of equipment.
4. Supply and install fillers as required.
5. Provide and install all lockers and locker bases.
6. Provide all number plates, and coordinate numbering with the Owner.
7. Master key to existing system if possible.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Responsible for furnishing and installing lockers for a complete system including bases.
3. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
4. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
5. Protect lockers from damage after installation.
6. Clean and dust all lockers upon completion.
7. Mandatory attendance at all required pre-installation meetings.
8. Mandatory attendance for all weekly construction meetings.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 105100**

**Bid Division:** 116000 – Recreation Equipment **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 012300 – Alternates  
Section 116000 - Recreation Equipment  
Section 116643 - Interior Scoreboards

**Limited Responsibility for Specification Sections:**

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

**General Inclusions:**

20. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
21. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
22. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
23. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
24. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
25. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
26. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
27. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
28. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
29. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
30. Submittal of all insurance, performance labor and material bonds as required, and schedule of values, within (2) two weeks of contract award.
31. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
32. Provide all layout and measurements required to perform the work of this Bid Division.
33. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
34. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.

**Bid Division:** 116000 – Recreation Equipment **For records only, not for bidding purposes**

35. Contractor shall have a supervisor on site at all times when a crew is present on the job.
36. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 37. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Only final connections are provided by other trade contractors.
2. Clean, prep, and adjust all equipment immediately prior to Owner occupancy.
3. Contractor is responsible to field verify all existing conditions including dimensions prior to fabrication and installation of recreation equipment.
4. Provide prep for installation of recreation equipment.
5. Protection of floor during installation during installation of recreation equipment and scoreboard.
6. Verify all power requirements and coordinate with other Bid Divisions.
7. Coordinate layouts with other trades, by providing shop drawings and coordination drawings.
8. Provide appropriate manpower and equipment to perform the work in this bid division.
9. Provide and install all anchors/mounting items/fasteners etc.
10. Provide proper legal off-site disposal for all debris generated from this bid division.
11. Field Verify power requirements for new scoreboards
12. Provide programming / controls to a dedicated computer within district and provide all adequate training for new scoreboard.
13. Furnish and install new scoreboard, including any required anchors, etc. for a complete system.
14. Provide all required programming and training for new scoreboard

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Refer to drawing A7.21 for alternate WP1.
3. This bid division must provide their own dumpster for their work or remove any debris that is a result of their work.
4. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
5. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
6. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
7. Any contractor who compounds a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.

**Excludes:**

1. Electrical final connections.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 116000**

**Wolgast Corporation – Construction Management**

**Bid Division:** 123000 - Casework For records only, not for bidding purposes

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 064000 – Architectural Woodwork  
Section 113013 – Residential Appliances  
Section 123600 – Countertops

**Limited Responsibility for Specification Sections:**

Section 079200 – Joint Sealants (as it relates to this bid division)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.

**Bid Division:**               **123000 – Casework**       **For records only, not for  
bidding purposes**

16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Only final connections are provided by other trade contractors.
2. Clean, prep, and adjust all equipment immediately prior to Owner occupancy.
3. Provide prep for installation.
4. Protection of floor during installation.
5. Verify all power requirements and coordinate with other Bid Divisions.
6. Field verify measurements before fabrication of equipment.
7. Supply and install fillers as required.
8. All tops shall be pre-drilled to accept accessories and mounted fixtures.
9. Provide all filler panels to match cabinets and/or countertops.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Furnish and install all casework as documented.
3. Furnish and install all materials required for custom casework, including all wall framing/blocking integral with the casework, as documented.
4. Furnish and install all countertop materials.
5. Furnish and install all caulking of countertops and all backsplashes at walls.
6. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
7. Mandatory attendance at all required pre-installation meetings.
8. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
9. Cover all countertops with double layered corrugated cardboard upon installation for protection.
10. Clean and dust all casework upon completion.

**Excludes:**

1. Electrical and mechanical final connections.
2. Installation of gas and water fixtures.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 123000**

**Wolgast Corporation – Construction Management**

**Bid Division:** 133419 – Metal Building Systems **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 133419 Metal Building Systems

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 033000 Cast In Place Concrete

Section 055000 Metal Fabrications (As it relates to the metal building structure and anchor bolts)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Fasteners, erection, and protection from weather until complete.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, performance labor and material bonds as required, and schedule of values, within (2) two weeks of contract award.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.

**Bid Division: 133419 – Metal Building Systems** For records only, not for bidding purposes

15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Supply and install a complete metal building system.
2. Provide all anchor bolts in cages ready for install by Concrete
3. Provide penetrations for MEP items as required. Coordinate exact size and location with other trades.
4. Provide and install all fasteners and sealants.
5. Provide and install all perimeter insulation, walls and roof/ceiling.
6. Provide and install all wind bracing as required.
7. Provide and install all framing details to accommodate the installation of all exterior doors and windows, including all jamb and header materials.
8. Provide finished overhead door openings and correct connection points for door and opener install.
9. Provide all interior liner panels attached to the metal building structure, with appropriate girders, and fasteners. Liner panels on interior steel stud framed partitions will be by others.
10. Coordinate with electrical and mechanical contractors for clearances, and equipment needs.
11. Provide framing in exterior walls for mechanical and electrical openings. Include flashing for exterior openings.
12. Provide all hoisting and unloading equipment.
13. Follow all MIOSHA safety requirements.
14. Provide all special inspections, certifications as required, including fasteners.
15. Provide all touchup to finished products as required.
16. Provide all submittals within 15 days of contract award.

**Project Inclusions:**

1. Responsible for Snow/Ice Guards on the PEMB only.
2. Mandatory attendance at all required pre-installation meetings.
3. Mandatory attendance for all weekly construction meetings.

**Excludes:**

1. Snow/Ice Guards for office portion of building will be the responsibility of the roofing contractor.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

END OF BID DIVISION 133400

**Wolgast Corporation – Construction Management**



**Bid Division:** 220000 – Plumbing & HVAC Systems **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 220517 – Sleeves and Sleeve Seals for Plumbing Piping  
Section 220519 – Meter and Gauges for Plumbing Piping  
Section 220523 – General-Duty Valves for Plumbing and Piping  
Section 220529 – Hangers and Supports for Plumbing Piping and Equipment  
Section 220553 – Identification for Plumbing Piping and Equipment  
Section 220719 – Plumbing Pipe Insulation  
Section 221005 – Plumbing Piping  
Section 221006 – Plumbing Piping Specialties  
Section 223000 – Plumbing Equipment  
Section 224000 – Plumbing Fixtures  
Section 230513 – Common Motor Requirements for HVAC Equipment  
Section 230517 – Sleeves and Sleeve Seals for HVAC Piping  
Section 230529 – Hangers and Supports for HVAC Piping and Equipment  
Section 230553 – Identification for HVAC Piping and Equipment  
Section 230593 – Testing, Adjusting and Balancing  
Section 230713 – Duct Insulation  
Section 230913 – Instrumentation and Control Devices for HVAC  
Section 230923 - Direct-Digital Control System for HVAC  
Section 231123 - Facility Natural-Gas Piping  
Section 233100 - HVAC Ducts and Casings  
Section 233300 - Air Duct Accessories  
Section 233416 - Centrifugal HVAC Fans  
Section 233423 - HVAC Power Ventilators  
Section 233424 - Circulation Fans  
Section 233439 - High-Volume, Low-Speed Propeller Fans  
Section 233600 - Air Terminal Units  
Section 233700 - Air Outlets and Inlets  
Section 237200 - Air-to-Air Energy Recovery Equipment  
Section 237416 - Packaged Rooftop Air-Conditioning Units  
Section 238126.13 - Small-Capacity Split-System Air Conditioners

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants  
Section 083100 – Access Doors and Panels (As required by this bid division.)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Plumbing, heating, ventilating, air conditioning, balancing, temperature control, etc., for a complete operational system.

**General Inclusions:**

- 1 There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
- 2



**Bid Division: 222300 – Plumbing & HVAC Systems** For records only, not for bidding purposes

- 3 The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor's bid division description.
- 4 Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
- 5 All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
- 6 Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division's work.
- 7 Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner's dumpsters is strictly prohibited.)
- 8 All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
- 9 This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
- 10 Any contractor who compounds a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
- 11 Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
- 12 Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
- 13 Provide all layout and measurements required to perform the work of this Bid Division.
- 14 The Owner reserves the right to salvage any materials removed from the site during the duration of the project. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
- 15 Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
- 16 Contractor shall have a supervisor on site at all times when a crew is present on the job.
- 17 On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 18 **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Concrete Patching for mechanical and electrical trades by Bid Division 222300 and 260000
2. Provide all blocking required for plumbing fixture mounting.
3. Perform all connections between site utilities and building, coordinate with site contractor on utilities.
4. Patch floors with concrete, where existing fixtures and pipe are removed and capped.
5. Furnish and install all fixtures in cabinetry as required.
6. Furnish all louvers and access panels to masonry and drywall contractors for installation.
7. Provide shop drawings to State Fire Marshall for Plan Review (allowing sufficient time for changes that may be made and must be completed prior to beneficial occupancy).

**Bid Division: 222300 – Plumbing & HVAC Systems**

8. Perform all excavating, backfill, and compaction required for the work of this bid division.
9. Furnish and install duct detectors, back draft dampers, etc. as shown and specified, and/or required by Code.
10. Provide all final plumbing hook-ups to all plumbing related fixtures and equipment.
11. Provide coordination with roofing and metal contractors for roof penetrations, equipment rails and pipe boots including layouts.
12. Remove debris generated from your scope of work from site.
13. Provide all required layout and verify that no conflict occurs with other trades.
14. Furnish operating and maintenance manuals.
15. Provide record and as-built drawings.
16. Provide all necessary connection between temperature control and instrumentation devices and equipment to be controlled.
17. Provide roof curbs for rooftop equipment.
18. Provide all permits required.
19. Provide all required work to prepare each piece of equipment to receive and allow for proper installation and operation of the temperature control modules and related automatic temperature control devices.
20. Provide temporary water distribution as required.
21. Provide all State Certification for equipment if required
22. Refer to all equipment schedules for additional equipment to be furnished and installed (including kitchen equipment and kitchen equipment schedules).
23. Furnish test and balance reports.
24. Contractor shall furnish and install temporary insulated weather-tight closures of openings created as a result of the work in this scope in exterior surfaces to provide acceptable working conditions and protection for materials, to allow temporary heating, and building security.
25. All HVAC equipment is to be completed with all motor starters, disconnects or other items to allow for the proper operation of the system.
26. Provide start-up training with Owner Representative, Architect and Construction Manager for all equipment installed.
27. Final installation and all work by this bid division must comply with governing building and life safety codes.
28. Provide water test approval two weeks prior to Owner Occupancy.

**Project Inclusions:**

- 1 Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
- 2 Include cost for all required permits in bid proposal and coordinate all required inspections.
- 3 Mandatory attendance at all required pre-installation meetings.
- 4 Mandatory attendance for all weekly construction meetings.
- 5 All plumbing and HVAC installations to meet all required governing requirements.
- 6 Furnish all access panels as required for the installation of the bid division's work.
- 7 Furnish and install all required gas piping.
- 8 Furnish and install all required waste, water supply and vent piping.
- 9 Furnish and install all roof sumps and all rainwater conductor lines.
- 10 Provide all required plumbing and HVAC insulation.
- 11 Provide all required test and balance work.
- 12 Provide and complete all controls connections and programming.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 222300**

**Wolgast Corporation – Construction Management**

**Bid Division:** 260000 – Electrical **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 260505 - Selective Demolition for Electrical  
Section 260519 - Low-Voltage Electrical Power Conductors and Cables  
Section 260526 - Grounding and Bonding for Electrical Systems  
Section 260529 - Hangers and Supports for Electrical Systems  
Section 260533.13 - Conduit for Electrical Systems  
Section 260533.16 - Boxes for Electrical Systems  
Section 260553 - Identification for Electrical Systems  
Section 260923 - Lighting Control Devices  
Section 262413 - Switchboards  
Section 262416 - Panelboards  
Section 262726 - Wiring Devices  
Section 262816.16 - Enclosed Switches  
Section 264300 - Surge Protective Devices  
Section 265100 - Interior Lighting  
Section 265600 - Exterior Lighting  
Section 270529 – Hangers and Supports for Communications Systems  
Section 270533.13 – Conduit for Communications Systems  
Section 275116 – Public Address Systems  
Section 281000 – Access control  
Section 282000 – Video Surveillance  
Section 284600 – Fire Detection and Alarm

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

All conduits, boxes, switches, etc., for a complete operational system.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications, including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.

**Bid Division:**               **260000 – Electrical**     **For records only, not for  
bidding purposes**

8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Contractor shall coordinate with utility company for purchase and installation of exterior transformers and associated work, if required.
2. Contractor shall coordinate with concrete contractor for locations of housekeeping pads and transformer pads. Concrete is by concrete contractor, layout and coordination is by electrical contractor.
3. Contractor shall furnish and install temporary insulated weather-tight closures of openings created as a result of the work in this scope in exterior surfaces to provide acceptable working conditions and protection for materials, to allow temporary heating, and building security.
4. Removal of electrical line power pole to old portable location.
5. Provide all permits required.
6. Supply and install exterior lights. (Including parking lot light bases.)
7. All excavation, backfill, compaction, and disposal of spoil for any electrical work placed below finish grade.
8. Coordinate with other trades for rough-in locations.
9. Provide temporary lighting and power distribution as required by MIOSHA code.
10. Provide all plywood or nailers required for mounting of electrical, audio, fire alarm or phone equipment.
11. Final hook-up of all equipment for other disciplines of work.
12. Furnish and install all light and power fixtures in cabinetry.
13. Provide "As Built" Drawings for work.
14. Provide proper repair of all damaged ceilings, walls, floors, etc., when installing new fixtures.
15. Install pull box and chase conduit for temp control.
16. Provide Owner with training of new equipment.
17. Provide shop drawings to State Fire Marshal Plan Review or governing authority (allow for sufficient time for changes that may be made & must be completed prior to beneficial occupancy.)

**Wolgast Corporation – Construction Management**

**Bid Division:**               **260000 – Electrical**               **For records only, not for  
bidding purposes**

**Project Inclusions:**

1. Include costs for all required permits in bid proposal.
2. Furnish and install all required backer boards for electrical equipment, fire rated as documented.
3. Provide all required coordination with other Bid Division contractors for installation of all electrical materials and equipment prior to the work commencing.
4. Provide final electrical connection for all equipment.
5. Provide service and connections for electric water coolers.
6. Furnish and install a complete and operational fire alarm system.
7. Furnish and install intercom and clocks.
8. Provide and install all intercom and access control hardware, conduits, cabling and programming.
9. Furnish and install all lighting control systems and provide Owner training of systems.
10. Furnish and install all conduits for cabling and data outlets as documented.
11. Furnish and install all required raceways and wire mold as documented.
12. Provide all required fire alarm/detection items. Provide all required paperwork, payments, certification coordination with Office of Fire Safety and State Fire Marshall.
13. Provide power and connection to door hold opens and connect to fire alarm system.
14. Furnish and install all smoke detectors.
15. Furnish access doors as required for installation by other contractors.
16. Provide and install all low voltage wiring and connections.
17. This bid division is responsible for all cabling work for this project and all final connections to devices and equipment.
18. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
19. Mandatory attendance at all required pre-installation meetings.
20. Mandatory attendance at all weekly meetings.
21. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 260000**

**Bid Division:**               **310000 – Site Work**       **For records only, not for  
bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

**Total Responsibility for Specification Sections:**

Section 003100.1 – Geotechnical Report  
Section 012300 - Alternates  
Section 015713 – Temporary Erosion and Sedimentation Control  
Section 312000 – Earthwork  
Section 329200 – Surface Protection, Restoration & Turf Establishment  
Section 331100 – Water Mains  
Section 333100 – Sanitary Sewers  
Section 334100 – Storm Sewers

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 079200 – Joint Sealants

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Clearing and stump removal of site and building areas, rough and fine grading, mass and building excavation, backfill, import and export of soils/fill, topsoil replacement and seeding. Provide all sand base course material for concrete sidewalks, exterior slabs, pads, etc. including placement, grading and compaction.

**General Inclusions:**

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.



**Bid Division:**               **310000 – Site Work**               **For records only, not for  
bidding purposes**

10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
- 19. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Removal of debris generated by this bid division from site.
2. Barricade trees to protect from construction.
3. Excavation for foundation is by the Concrete Contractor - Bid Division 030100.
4. Selective Demolition of site to within 5 feet of building, including but not limited to fencing, asphalt removal, curb, sidewalk, landscaping, concrete stoops, pipe railings, playground equipment, flag pole, etc.
5. Provide de-watering for work in your Bid Division.
6. Furnish and install all gravel base material; finish grading of gravel, compaction and preparation for all placement of asphalt paving.
7. Finish grading of all topsoil, plant beds and seed. Excavation, backfill, removal and disposal of spoil for all planting and landscape items. Repair all areas of construction to original state, or improving upon by seeding.
8. Review the complete geotechnical report, particularly the soil borings. This Bid Division contractor is responsible to provide all designated fill for this project. Any assumed fill to be used from the project site is at the risk of the Contractor.
9. Provide all aggregate base course and sand cushions directly below concrete slabs on grade for buildings and sidewalks and all other exterior concrete +/- 0.1. Cushions to be depth as indicated in contract documents and specifications.
10. All site demolition required for installation of asphalt work and final site work.
11. Engineering layout and grade certifications. All associated excavation, backfill, compaction, and clean up. Connection charges. Street, concrete and pavement cutting, removal, and patching. Barricades and traffic control.
12. Responsible for all required permit for erosion and sedimentation control.
13. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
14. All seeding required for all areas affected by construction.
15. Aggregate base course to be finished graded after placement and also immediately prior to lay down of asphaltic concrete paving.
16. All required topsoil. Topsoil to be graded to + .1 feet of designed finish grade after placement and also immediately prior to landscaping activities.
17. All site utilities as it relates to water, storm, sanitary, and gas to within 5 feet of building.

**Wolgast Corporation – Construction Management**

**Bid Division:**               **310000 – Site Work**       **For records only, not for  
bidding purposes**

18. Review soil borings, the Sitework Contractor is responsible to provide all designated fill for this project. Any assumed fill to be used from the project site is at the risk of the Contractor.
19. Provide temporary fencing around all additions during construction.
20. Provide all required permits.
21. Patching of asphalt on parking lot disturbed during construction if caused by this Bid Division.
22. Provide all import fill soils and export of all spoil or unusable soils necessary to complete all work or required by the construction documents.
23. Temporary care & maintenance of all plants and lawns until final completion of all work and acceptance by Owner.
24. Notify and correspond with Miss Dig before work commences and throughout the project.
25. All saw cutting of asphalt and concrete as required on site.
26. Tie into all downspouts within 5 feet of the buildings. (Coordinate with Bid Division 222300 – Mechanical)
27. Furnish and install irrigation sleeves as required.
28. Site work Contractor is responsible to provide, install and maintain all erosion control requirements.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources.
2. Provide all required permits. Soil Erosion permit will be provided by this contractor. This contractor is responsible for installation of all required soil erosion materials and all maintaining, monitoring and reporting required for the erosion and sedimentation control permit for the entire duration of the project. Provide inlet filters at all storm catch basins.
3. Install sediment control silt fence. Once the turf is established and final approvals have been received, remove.
4. Install sediment control, inlet protection, and filter drop at catch basins. Upon completion of the project, remove and clean all accumulated sediment at catch basins as documented.
5. All concrete stoops and walks to be removed by this Bid Division.
6. Provide all required saw-cutting and removal of asphalt and concrete material.
7. Provide all stripping of site materials as required for the installation of new work.
8. Provide all required proof rolling of existing soil.
9. Provide all required stone and sand fill and compaction as required.
10. Provide all required re-grading with fill and removal as necessary to achieve revised grades as documented.
11. Provide all required water, storm sewer and sanitary sewer work 5' outside building wall line unless noted otherwise.
12. Provide and install temporary traffic tracking pads at drives entrances.
13. Provide traffic control as needed.
14. Provide sand base for walks and building pad as documented.
15. Furnish and install all storm and sanitary piping.
16. Provide and install proposed manhole as indicated in drawings and specifications.
17. Patching of existing asphalt drive disturbed during construction if caused by this Bid Division.
18. Provide complete turf restoration including all removal and prep of existing surface and all required watering and fertilizing until the seed is established and is accepted by the owner.
19. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
20. Mandatory attendance at all required pre-installation meetings.
21. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
22. Include an allowance of \$7500.00 for temporary fencing. This must be included by line item on the schedule of values. Temporary fencing allowance to be used at the discretion of the construction manager.
23. Refer to alternate for irrigation



**Bid Division:**               **310000 – Site Work**       **For records only, not for  
bidding purposes**

**Excludes:**

1. Concrete Testing
2. Temporary Bracing.
3. Soil Density Testing
4. Final Site Utility hook-up by Bid Division 222300.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 310000**

**Bid Division:** 321200 – Paving & Surfacing **For records only, not for bidding purposes**

**Bid to Include:**

**Total Responsibility for Specification Sections:**

Section 012300 - Alternates  
Section 321217 – Hot Mixed Asphalt Paving – Superpave Mixtures

**Limited Responsibility for Specification Sections (as it relates to work in this Bid Division):**

Section 312000 - Earthmoving (As it applies to the work of this Bid Division)

**Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:**

Fine grading of parking lot base, asphalt concrete paving, lot stripes and markings, final clean of parking lot prior to Owner occupancy.

**General Inclusions:**

20. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
21. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
22. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
23. All contractors are responsible for the entire set of plans and specifications; including tables, schedules, and notes.
24. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
25. Contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
26. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
27. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
28. Any contractor who compounds a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
29. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
30. Submittal of all insurance, performance labor and material bonds as required, and schedule of values, within (2) two weeks of contract award.
31. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
32. Provide all layout and measurements required to perform the work of this Bid Division.
33. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.

**Bid Division:**           **321200 – Paving & Surfacing**           **For records only, not for bidding purposes**

34. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery, and provide proper personnel and equipment to perform the unloading.
35. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
36. Contractor shall have a supervisor on site at all times when a crew is present on the job.
37. On Friday, or last workday of each week, the Contractor must update the Master Copy of As-Built, as it applies to the work of their Bid Division.
- 38. Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**

**Division Inclusions:**

1. Placement of asphalt paving.
2. Pavement markings and striping.
3. Finish grading of gravel and preparation for all placement of asphalt paving.
4. Provide cleaning of base coat prior to application of finish coat.
5. Provide cleaning of top course prior to installation of pavement markings
6. Final cleaning of parking lot prior to Owner occupancy.
7. Provide all site signage.
8. Final adjustment of all structures within the paved areas, prior to top coat being applied.

**Project Inclusions:**

1. Review the milestone schedules. This bid division's work will be required to be completed at multiple locations and concurrently for some of the work. Prepare your bid proposal accordingly to allow for sufficient manpower and resources to meet the completion date. If overtime work is required to keep the project on schedule and to complete the project per the schedule, this contractor shall include any overtime or premium rates in their bid proposal as necessary to ensure the project completion date and or task completion dates are met. Note that the timing of all tasks may change as required to stay on schedule and no contractor shall cause a delay in meeting their own or any other contractor's obligations as it pertains to the milestone schedule. The milestone schedule will be used as a template to create the construction schedule once input has been received from all awarded contractors, however the completion dates as listed in the milestone schedule will need to be achieved.
2. Provide all required barricades and traffic control during the performance of this bid division's work.
3. Provide all required fine grading prior to placement of asphalt material. Provide watering of stone base if necessary to achieve final compaction during fine grading immediately prior to placement of asphalt.
4. Provide all pavement markings and striping.
5. Furnish and install traffic and parking signage.
6. Must repair all concrete work damaged during the installation of the asphalt work.
7. Provide all cleaning of leveling course and asphalt binder between leveling and wearing courses, if the courses are placed at different times.
8. Repair and reseed all lawn areas damaged during the installation of the asphalt work.
9. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
10. Mandatory attendance at all required pre-installation meetings.
11. Completion of all punch list work within 5 working days or less upon receipt of punch list items, unless specific circumstances occur that are out of control of this bid division contractor dictate otherwise.
12. Provide required manpower along with required work hours (including weekends if required) to meet the indicated schedule. There will be no cost compensation to meet schedule, if this contractor is behind the published milestone schedule.

**Bid Division: 321200 – Paving & Surfacing**

For records only, not for  
bidding purposes

**Excludes:**

1. Asphalt Testing
2. Compaction Testing.

**Consideration for award:**

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

**END OF BID DIVISION 310000**

**PART 1 – GENERAL**

**1.01 DEFINITION**

- A. Clarification Request forms shall be used to document all questions regarding bidding documents and technical specifications. Please use **ONE** Clarification Form for each item.
- B. The Clarification Request form follows as page 2 of this Section.

**1.02 PREPARATION OF CLARIFICATION REQUEST FORM**

- A. The Contractor shall complete the following items on the Clarification Request form:
  - 1. Date
  - 2. Contractor Name
  - 3. Contractor contact person
  - 4. Contractor email, phone, and fax number
  - 5. Item(s) for clarification
- B. The Contractor shall forward the Clarification Request form, via fax or email, to the Construction Manager **no later than 5 days prior to bid due date**. Request from bidders for clarification, or interpretation of the bidding documents must reach the Project Team five days before the bid date, or by the date addressed in the pre-bid agenda. Any bidder clarifications which reach the project team after such dates have passed will not be considered.

**1.03 RESPONSIBILITIES FOR COMPLETION OF CLARIFICATION REQUEST FORMS**

- A. The Construction Manager shall review and number Clarification Request forms as they are received.
- B. Clarification Requests regarding BIDDING INSTRUCTIONS OR PROCEDURES shall be answered by the Construction Manager.
- C. Clarification Requests regarding the DESIGN and/or TECHNICAL SPECIFICATIONS shall be answered by the Architect. The Construction Manager shall forward technical specification clarifications to the Architect, via fax or mail, as they are received.

**1.04 RESPONSE TO CLARIFICATION REQUEST FORMS**

- A. The Architect shall review each Clarification Request form received and return responses to the Construction Manager.
- B. As noted in Items 1.03.B and 1.03.C above, it is the responsibility of both the Construction Manager and the Architect to respond to Clarification Request forms.
- C. Responses shall be issued via the “Response” section of the Clarification Request form or Addenda.

**CLARIFICATION REQUEST FORM**

Date: \_\_\_\_\_

Wolgast Clarification Request  
#: \_\_\_\_\_

To: Wolgast Corporation  
**Matt Moser** or **Christie Bigelow-Huver**  
4835 Towne Centre Road, Suite 203  
Saginaw, MI 48604  
Phone (989) 790-9120, Fax (989) 790-9063

From: \_\_\_\_\_  
Contractor Name  
\_\_\_\_\_  
Contact Name  
\_\_\_\_\_  
Email Address  
\_\_\_\_\_  
Phone # \_\_\_\_\_ Fax # \_\_\_\_\_

Bid Division # and Name: \_\_\_\_\_

CSI Code (If Applicable): \_\_\_\_\_

Drawing #: \_\_\_\_\_ Detail or Item #: \_\_\_\_\_

Reason for Request:  More Detail Needed  Engineering Clarification  Alternate Proposal  Other

Project: **Oscoda Area Schools 2024 Bond Program**

Site Location: **Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection**

**ITEM(S) FOR CLARIFICATION OF BID: (Please use one form for each item)**

Please review and respond to the following item(s) for clarification:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RESPONSE:**  **ITEM TO BE INCLUDED IN ADDENDUM**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Construction Manager: \_\_\_\_\_  
Signature Date

Architect: \_\_\_\_\_  
Signature Date

**END OF SECTION 00310**

**PART 1 – GENERAL**

**1.01 BID SECURITY**

- A. Each Proposal shall be accompanied by Bid Security pledging that the Bidder will enter into a contract with the Owner on the terms stated in the Proposal, and will, if required, furnish bonds as described in Section 00600. Should the Bidder refuse to enter into such contract or fail to furnish such Bonds, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- B. Bid Security shall be in the amount of five percent (5%) of the Base Bid(s).
- C. Bid Security for each Proposal containing Bids for multiple Bid Divisions shall be in the amount of five percent (5%) of the total Base Bids for the highest-priced combination of Bid Divisions included in the Proposal
- D. Bid Security may take the form of a **Bid Bond, a Cashier's Check, or a Money Order made payable to the Owner.** When submitting a Cashier's Check or Money Order a separate check or money order must accompany each Bid Division.
- E. Bid Security that is in the form of a Cashier's Check or Money Order will be returned to Bidders within a reasonable period after construction contracts have been executed, returned and approved by the Owner.

**END OF SECTION 00410**

**PART 1 – GENERAL**

**1.01 OWNER/CONTRACTOR AGREEMENT**

- A. The Agreement between the Owner and the Contractor will be written on the Owner's standard Owner/Contractor Agreement Form. A sample of this Form appears as Section 00510.
- B. The Owner/Contractor Agreement Form will be filled in by the Owner, as appropriate for each Contractor and will be sent to each Contractor.
- C. The executed Owner/Contractor Agreement, the General Conditions and the other Contract Documents will be the entire, integrated Contract between the Owner and each Contractor.
- D. Upon receipt of an Owner/Contractor Agreement, each successful Bidder shall review it for completeness and accuracy, execute it and return it to the Owner's Representative for delivery to the Owner.
- E. Each successful Bidder shall submit all required post-bid documents, including Labor and Material Payment Bond and Performance Bond (Section 00600) unless waived by the Owner, Certificates of Insurance (Section 00650), Schedule of Values (Section 00670), Subcontractor and Supplier Listing (Section 00680), and Employee Listing (Section 00690) as a prerequisite to execution of the Owner/Contractor Agreement
- F. The Owner will execute each Owner/Contractor Agreement after it has been properly executed by the Bidder and after all required post-bid documents have been submitted.

**1.02 NOTICE TO PROCEED**

- A. The Owner may elect to issue Notices to Proceed prior to the execution of Owner/Contractor Agreements.
- B. Upon receipt of Notice to Proceed, each Contractor shall commence work in accord with the conditions contained in the Notice to Proceed
- C. Regardless of the provisions of any Notice to Proceed or of this Section, no Contractor shall commence work until all required insurance is in force and Certificates of Insurance (Section 00650) have been submitted to the Owner's Representative for delivery to the Owner.
- D. Prior to commencement of work, Contractors shall submit evidence satisfactory to the Owner that required bonds will be furnished and shall deliver the Bonds by the date the Contractor executes the Owner/Contractor Agreement.
- E. The Owner may include Notice to Proceed in Purchase Orders.

**1.03 COMMENCEMENT OF WORK**

- A. Each Contractor shall commence work immediately upon receipt of Notice to Proceed under the conditions contained in the Notice to Proceed or upon execution of an Owner/Contractor Agreement, whichever is earlier.

**END OF SECTION 00500**



**SAMPLE  
OWNER-CONTRACTOR  
CONTRACT ON  
FOLLOWING PAGE**

END OF SECTION 00510



# Document A132™ - 2019

## **Standard Form of Agreement between Owner and Contractor, Construction Manager as Adviser Edition**

**AGREEMENT** made as of the «Day» of «Month» in the year «Year»  
(in words, indicate day, month and year)

**BETWEEN** the Owner:

*(Name, legal status, address and other information)*

«Owner Name»

«Owner Address»

«Owner CSZ»

Telephone:

Facsimile:

and the Contractor:

*(Name, legal status, address and other information)*

«Contractor»

«Address»

«CSZ»

Telephone:

Facsimile:

for the following Project:

*(Name, legal status, address and other information)*

«Project Description»

«Project Name»

«Project Address»

«Project CSZ»

«Bid Division» - «Description»

The Construction Manager is:

*(Name, legal status, address and other information)*

Wolgast Corporation

4835 Towne Centre Road, Suite 203

Saginaw, MI 48604

Telephone: (989) 790-9120

Facsimile: (989) 790-9063

The Architect is:

*(Name, legal status, address and other information)*

«Architect Name»

«Architect Address»

«Architect CSZ»

Telephone:

Facsimile:

The Owner and Contractor agree as set forth below.

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

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction. Construction Manager as Adviser Edition: B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.





**§ 3.3.2** The Contractor agrees that time is of the essence and to start work when directed by the Construction Manager and to furnish sufficient materials and a sufficient number of properly skilled works, so as not to delay the work of any other Contractor or completion of the project.

**ARTICLE 4 CONTRACT SUM**

**§ 4.1** The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be one of the following:  
(Check the appropriate box.)

Stipulated Sum, in accordance with Section 4.2 below:

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

**§ 4.2 Stipulated Sum**

**§ 4.2.1** The Stipulated Sum shall be «Contract Amount» Dollars (\$«Contract Amount »), subject to additions and deductions as provided in the Contract Documents. The Contract Sum includes Base Bid, PLM Bonds, and Alternates.

Contract amount includes: Base Bid \$«Base Bid», PLM Bond Amount \$«Bond Amount», Alternates \$«Alternate» totaling \$«Contract Amount ».

**§ 4.2.2 Alternates**

**§ 4.2.2.1** Alternates, if any, included the Contract Sum:

Item	Price
<u>«Alternate Description»</u>	

**§ 4.2.2.2** Subject to the conditions noted below, the following alternates may be accepted by the Owner in writing following execution of this Agreement. Upon the Owner’s written acceptance, the accepted alternate shall constitute Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
------	-------	---------------------------

**§ 4.2.3** Allowances, if any, included in the Contract Sum:  
(Identify each allowance.)

Item	Price
------	-------

**§ 4.2.4** Unit Prices, if any:

(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

To the extent this Agreement includes unit prices, those unit prices shall be fixed for the entire term of this Agreement through Final Completion. Any increase in any unit price or any price in labor or materials shall be borne by the Contractor and shall not be passed on to the Owner or submitted to the Owner as a Change Order or otherwise reimbursed by the Owner. No additional mark-ups shall apply to unit prices.

**§ 4.3 Contract Sum**

The Owner agrees to pay and the Contractor agrees to accept the sum set forth in the Contract Sum as full compensation for all labor, supervision, equipment, home office and field overhead, materials, administrative and incidental expense required in executing all of the Work contemplated in this Agreement as set forth in the plans and specifications, including all loss or damage arising out of the Work, as impacted by the elements or from any

AIA Document A132™ - 2019. Copyright © 1975, 1980, 1992, 2019 and 2019 by The American Institute of Architects. All rights reserved. This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. To report copyright violations, e-mail The American Institute of Architects’ legal counsel, copyright@aia.org.

obstruction, delay or difficulties which may be encountered. It is further agreed that the Work may be modified only in accordance with the Contract Documents. No claims for extra compensation or adjustments in the Contract Sum will be made by or due to the Contractor on account of delay, costs incurred as a result of variations within the as-planned schedule, or the failure of others to complete any of the Work as scheduled.

## **ARTICLE 5 PAYMENTS**

### **§ 5.1 Progress Payments**

**§ 5.1.1** The Construction Manager will provide a Contractor Invoice Form to the Contractor for submitting the Contractor's request for payment each month. All reference to "Application for Payment" or "Progress Payment Request" shall mean "Contractor Invoice Form". Based upon Applications for Payment submitted to the Construction Manager by the Contractor and upon certification of the Application for Payment by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor, as provided below and elsewhere in the Contract Documents.

**§ 5.1.2** The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

See Contractor Invoice Form Due Date on Attachment "A"

**§ 5.1.3** Provided an Application for Payment is received by the Construction Manager not later than the "Contractor Invoice Form Due Date" found on Attachment "A", the Owner shall make payment of the amount certified in the Application for Payment to the Contractor for all undisputed amounts not later than forty-five (45) days after the "Owner Approves Invoice" date found on Attachment "A". If an Application for Payment is received by the Construction Manager after the application date fixed above, payment for all undisputed amounts shall be made by the Owner after the Construction Manager receives the Application for Payment and at the payment date for the Applications for Payment of the following month.

*(Federal, state or local laws may require payment within a certain period of time.)*

### **§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum**

**§ 5.1.4.1** Each Contractor Invoicing Form and Construction Manager prepared Progress Payment Request Form shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values, unless objected to by the Construction Manager, shall be used as a basis for reviewing the Contractor's Invoicing Form and Construction Manager prepared Progress Payment Form.

**§ 5.1.4.2** The Contractor Invoicing Form shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

**§ 5.1.4.3** In accordance with AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

**§ 5.1.4.3.1** The amount of each progress payment shall first include:

- .1** That portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions; and
- .2** Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing, less retainage of ten percent (10%); and
- .3** Add that portion of Construction Change Directives that the Owner determines, after advice and consent from the Architect in the Architect's professional judgment, to be reasonably justified; and



- .4 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ninety percent (90%) of the Contract Sum, less such amounts as the Construction Manager and Owner recommends and the Owner determines for incomplete Work and unsettled claims; and
- .5 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner.
- .2 The amount, if any, for Work that remains uncorrected and for which the Construction Manager or Architect has previously withheld or nullified a Certificate for Payment;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay.
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, refuse to certify in the Certificate for Payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232-2019;
- .5 Any amount for which the Owner withheld payment, and
- .6 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.4.4 The Contractor shall submit to the Construction Manager an itemized progress payment request by the date required in Section 01045 of the Project Manual. The progress payment request is referred to as the Contractor Invoice Form. After the schedule of values is submitted to and approved by the Construction Manager, the Construction Manager will prepare a Contractor Invoice Form master template in accordance with the approved schedule of values and provide it to the Contractor for use to prepare all progress payment requests. The Contractor shall submit a signed and notarized original Contractor Invoice Form for each monthly progress payment request. It shall be accompanied by such supporting data and documents the Owner, Construction Manager and Architect may require substantiating the Contractor's right to payment.

1. Contractor Invoice Form as defined as: See Section 1045 (Contractors Application for Payment)
2. Cost Control Manual as defined as: See Section 1045 (Contractors Application for Payment)
3. Progress Payment Request as defined as: See Section 1045 (Contractors Application for Payment)

#### § 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

Ten percent (10%) retainage

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

*(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)*

Ten percent (10%) retainage shall be held back until the project is complete.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is finally complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Application for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is finally complete shall not include retainage as follows:

*(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)*

Damages incurred by the Owner due to the Contractor's negligence or breach of this Agreement.

**§ 5.2 Final Payment**

**§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum**

**§ 5.2.1.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232-2019, as modified, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

**§ 5.2.1.2** The Owner's final payment to the Contractor shall be made no later than 30 days after Owner's receipt of the final executed Certificate for Payment or Project Certificate for Payment, or as follows:

If amounts are withheld from the final payment to cover any incomplete work, such withheld amounts are not considered retainage and shall not be paid to the Contractor until the work is actually completed and accepted. Such withholdings shall not be less than 150% of the estimated cost to complete the work.

**§ 5.2.1.3** The following must be submitted to the Construction Manager before the acceptance and submission of final payment in addition to requirements of other sections:

- .1 All required closeout documents including warranties, guarantees, operation and maintenance documents, and training;
- .2 As-Builts Drawings;
- .3 Itemized lists of all surplus and extra materials required per specifications at which time the Construction Manager will schedule the delivery of such materials to the Owner by the Contractor;
- .4 Consent of Surety to Final Payment;
- .5 Submit Releases and Final Unconditional Waivers of Lien from all suppliers and subcontractors;
- .6 Submit certification stating that no materials containing asbestos were incorporated into the Work;
- .7 Submit certification that all punch list items have been completed.

**§ 5.3** Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

*(Insert rate of interest agreed upon, if any.)*

Five Percent (5%) per annum % See MCL 438.31

**ARTICLE 6 DISPUTE RESOLUTION**

**§ 6.1 Initial Decision Maker**

The Architect will serve as Initial Decision Maker pursuant to Section 15 of AIA Document A232-2019, as modified.

*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

N/A

**§ 6.2 Binding Dispute Resolution**

For any Claim subject to, but not resolved by, mediation pursuant to Section 15 of AIA Document A232-2019, as modified, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box.)*

- Arbitration pursuant to Section 15 of AIA Document A232-2019
- Litigation in a court of competent jurisdiction
- Other: *(Specify)*



If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

**§ 6.2.1** The Owner and the Contractor agree that all disputes between them arising out of or relating to this Agreement shall be submitted to non-binding mediation, unless the parties mutually agree otherwise. All parties shall endeavor to settle disputes by mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Demand for mediation shall be filed in writing with the other party of this Agreement and with the American Arbitration Association. A demand for mediation shall be made within a reasonable time after the claim, dispute, or other matter in writing to the other party. In the event non-binding mediation fails to resolve any or all of the disputes or claims, the parties may pursue relief through any other legal and/or equitable means.

**§ 6.2.2** The Owner reserves the right in its discretion to require consolidation or joinder of any mediation relating to this Agreement with another mediation involving an independent contractor or consultant engaged by the Owner in connection with the Project. Agreement in the event the Owner believes such consolidation or joinder is necessary in order to resolve a dispute or avoid duplication of time, expense, or effort.

**§ 6.2.3** In the event the Owner is involved in a dispute which is not subject to mediation involving a person or entity not a party to this Agreement, the mediation provision of this Article shall be deemed to be void and nonexistent in the event the Owner, in its discretion, determines the Contractor should become a part to that dispute by joinder or otherwise.

**§ 6.2.4** The Owner reserves the right to require any mediation to be held near the Owner's principal place of business.

## **ARTICLE 7 TERMINATION OR SUSPENSION**

### **§ 7.1 Where the Contract Sum is a Stipulated Sum**

**§ 7.1.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2019, as modified.

**§ 7.1.2** The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2019, as modified.

## **ARTICLE 8 MISCELLANEOUS PROVISIONS**

**§ 8.1** Where reference is made in this Agreement to a provision of AIA Document A232-2019 or another Contract Document, the reference refers to that provision as modified by the Owner and as amended or supplemented therein, or as amended or supplemented by other provisions of the Contract Documents. All references to AIA Document A232-2019 refer to that document as modified by the Owner, which modified document is incorporated into this Agreement as modified. The Contractor may request a copy of that document from the Construction Manager.

**§ 8.2** The Owner's representative:  
(Name, address, email address, and other information)

«Owner Name»

«Owner Address»

«Owner CSZ»

**§ 8.3** The Contractor's representative:  
(Name, address, email address, and other information)

«Contractor»

«Address»

«CSZ»

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

### § 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, and elsewhere in the Contract Documents.

#### Type of Insurance

#### Limit of Liability (\$0.00) Per Specifications

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™-2019, and elsewhere in the Contract, as required by MCL 129.201, et seq.

§ 8.8 Other provisions:

§ 8.8.1 The Project Team is comprised of the Owner, Construction Manager, Owner's Representative and Architect.

§ 8.8.2 The Bid Division Description(s) outline the work items that the Contractor is responsible to provide for the Project regardless of any customary practices or agreements of that trade.

§ 8.8.3 If a Project Team member has reasonable objection to the actions of or the manner by which work is performed by a person directly employed by the Contractor or by any subcontractor of the Contractor, the Contractor shall propose another to whom the Project Team has no reasonable objection. Any cost associated with the removal and replacement of such a person shall be at the expense of the Contractor. Nothing herein shall be interpreted to modify the independent contractor relationship between Owner and Contractor.

§ 8.8.4 All Change Orders and Change Directives will be initiated by a Change Event. (Reference Sections 01051, and 01053 of the Project Manual). The Change Event will be the instrument by which the Contractor will submit a detailed and itemized cost proposal for a proposed change for review by the Construction Manager, Owner's Representative and Architect, and the approval by the Owner, before the contract change is issued. A Change Event shall not alter the Contractor's obligation to comply with the process of filing claims in accordance with other provisions of this agreement.

§ 8.8.5 All Contractors must conform to the provisions of the Michigan Right-To-Know Law, 1986 PA 80. All Contractors must have available on site a copy of all Safety Data Sheets and in addition provide a copy to the Construction Manager. The Construction Manager will return the copy of the Contractor's Safety Data Sheets at the completion of the project.

§ 8.8.6 The Contractor shall include similar dispute resolution provisions in all agreements with subcontractors, sub-consultants, suppliers, or fabricators so retained, thereby providing for a consistent method of dispute resolution among the parties to those agreements.

§ 8.8.7 In the event of any inconsistency between this agreement and the General Conditions of the Contract for Construction (the "General Conditions"), the terms of this agreement shall govern.

§ 8.8.8 Claims or causes of action by the Owner arising under this Agreement shall be subject to the limitations provisions defined in Michigan law, except that in no event shall a claim or cause of action by the Owner be deemed untimely if filed within six (6) years of the final project completion. This provision is acknowledged to apply notwithstanding any other and shorter time frames contractually applicable to claims of the Contractor.

§ 8.8.9 The Agreement shall be governed by the laws of the State of Michigan.

§ 8.8.10 The Owner, being a governmental unit, is protected by the Michigan Void Construction Contracts Act, MCL 691.991.

§ 8.8.11 Notwithstanding any provisions within the Contract Documents, nothing shall be deemed a waiver of any immunity granted to Owner by law or statute, including but not necessarily limited to, governmental immunity under MCL 691.3407. The provisions of the General Conditions related to any waiver of subrogation are hereby deleted from the document and shall be deemed to have no effect. Further, any provision interpreted as the Owner waiving consequential or other indirect damages shall be ineffective and void.

§ 8.8.12 The Contractor agrees that neither it nor its Subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this Agreement, with respect to hire, tenure, conditions or privilege of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, sexual orientation, gender identity or expression, height, weight, or marital status. Breach of this covenant may be regarded as a material breach of this Agreement.

§ 8.8.13 All Contractor employees assigned to work under this Agreement may, at Owner's discretion, be subject to a background check and clearance by the Owner. Failure to obtain such clearance from the Owner may result in mandatory dismissal from the Owner's property and/or termination of the Agreement.

§ 8.8.14 The Contractor shall indemnify and hold harmless the Owner and its board members, officers, administrators, employees, and agents ("Indemnified Parties") from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees arising out of, or resulting from, this Agreement or Contractor's performance of the Work. The Contractor shall defend any and all suits brought against the Indemnified Parties by any party for damage to property and/or injury or death to persons claimed to have been caused by Contractor's performance of the Work. In the event of any such injury, death, loss, damage, or claim (or notice of any claim related to same). Contractor shall immediately give written notice to Owner regarding same.

§ 8.8.15 The modifications made to AIA Document A232-2019 Edition by the Owner are hereby incorporated into this Agreement.

§ 8.8.16 All specified insurance certificates and/or insurance policies must be received by the Construction Manager prior to the Contractor commencing work. The Contractor agrees to furnish a performance bond, and labor and materials payment bond for the full amount of this contract, including change orders.

## ARTICLE 9 ENUMERATIONS OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, as modified.
- .2
- .3 AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified. See Section 8.1.
- .4
- .5 The Drawings are as follows, and are dated «Drawings Dates» unless a different date is shown below: See Attachment "C"

Number	Title	Date
--------	-------	------

- .6 The Specifications are those contained in the Project Manual dated «Manual Dated» unless a different date is shown below: See Attachment "B"

Section	Title	Date	Pages
---------	-------	------	-------

- .7 The Addenda, if any:

Number	Date	Pages
<u>«Addendum 1»</u>	<u>«Adm Date»</u>	

«Addendum 2» «Adm 2 Date»  
«Addendum 3» «Adm 3 Date»

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:  
Supplementary and other Conditions of the Contract: Those contained in the Project Manual dated «Manual Dated» unless a different date is shown below: See Attachment “B”

Document	Title	Date	Pages
----------	-------	------	-------

- .9 Other documents, if any listed below:  
*(List here any additional documents that are intended to form part of the Contract Documents.)*

Pre-Bid Meeting and Agenda  
Post-Bid Interview Form  
Pre-Construction Meeting and Agenda

In the event of any inconsistency or ambiguity within, between or among the various Contract Documents, the terms most beneficial to the Owner (as determined in the Owner’s sole discretion) shall govern.

This Agreement is entered into the day and year first written above.

OWNER  
«Owner Name»

CONTRACTOR  
«Contractor»

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

«Owner and Title»  
(Printed name and title)

\_\_\_\_\_  
(Printed name and title)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Date)

**PART 1 – GENERAL**

**1.01 BID BONDS**

- A. Bid Security must be in the form of a Bid Bond or a certified check made payable to the Owner.
- B. When a Bid Bond is submitted, the Owner shall be listed as obligee.
- C. When a Bid Bond is submitted, the attorney-in-fact that executes the bond on behalf of the Surety shall attach to the Bond a certified, current copy of their Power of Attorney.
- D. **THE BID BOND AND ALL OTHER BONDS MUST BE ISSUED BY A SURETY COMPANY LICENSED AS SUCH TO DO BUSINESS IN THE STATE OF MICHIGAN.**

**1.02 LABOR & MATERIAL PAYMENT BONDS AND PERFORMANCE BONDS**

- A. The Owner reserves the right to require any successful Bidder to furnish both a Labor and Material Payment Bond, and a Performance Bond, each in the amount of one hundred percent (100%) of their contract amount.
- B. **THE LABOR & MATERIAL PAYMENT BOND AND THE PERFORMANCE BOND MUST BE ISSUED BY A SURETY COMPANY LICENSED AS SUCH TO DO BUSINESS IN THE STATE OF MICHIGAN.**
- C. When required, Labor and Material Payment Bonds and Performance Bonds must be separate. The combined form will not be accepted. Labor & Material Payment Bonds and Performance Bonds must be submitted on AIA Document A312, 2010 edition, without modifications.
- D. When submitted, Labor and Material Payment Bonds and Performance Bonds shall include:
  - 1. Full name and address of Contractor Surety and Owner.
  - 2. The proper Contract Date.
  - 3. The exact amount of the Contract.
  - 4. A description of the contract work / project.
  - 5. The Owner's name and address.
  - 6. An incorporation by reference of the contract terms.
  - 7. Language obligating the Surety, jointly and severally, with the Contract to the Owner
  - 8. The condition for discharge to the Surety.
  - 9. Signature.
  - 10. Corporate Seal, if applicable.
  - 11. Notarization.
  - 12. Power of Attorney.

**1.03 SUPPLY BONDS**

- A. The Owner reserves the right to require any direct supplier to furnish a Supply Bond in the amount of one hundred percent (100%) of their contract amount.
- B. Supply Bonds shall include all information required above (reference 1.02C above) for Labor and Material Payment Bonds and Performance Bonds.
- C. **ALL SUPPLY BONDS SHALL BE LEGAL AND ENFORCEABLE IN THE STATE OF MICHIGAN.**

**1.04 BOND COSTS IN BIDS**

- A. Do not include costs for Labor and Material Payment Bond(s), Performance Bond(s), or Supply Bond(s) in Base bid. State the cost of such Bond(s) separately, in the space(s) provided on the Proposal Form (Section 00300).

**1.05 SUBMISSION OF BONDS**

- A. Bonds shall be submitted to the Construction Manager for delivery to the Owner within fifteen (15) days following the date of issue of the Contract.
- B. Bonds must be submitted prior to contract execution and accepted by the Owner before work may begin on-site.
- C. If the work is commenced prior to contract execution in response to a Notice to Proceed (reference Section 00500), the Contractor shall, prior to commencement of the work, submit evidence satisfactory to the Owner that required bonds will be furnished, and shall deliver the Bonds by the date the Bidder executes the Owner/Contractor Agreement (reference Section 00510).

**END OF SECTION 00600**

**PART 1 – GENERAL**

**1.01 INSURANCE CERTIFICATES**

- A. Each Contractor shall provide, prior to the beginning of Work, a certificate of insurance for delivery to the Owner indicating that all required insurance coverage is in force.
- B. Use standard Insurance Certificate Form. The Accord Form 25 (2016/03) are preferable forms. These forms should be obtained from your Insurance agent.
- C. Issue all certificates to: **Oscoda Area Schools**  
**3550 E. River Rd.**  
**Oscoda, MI 48750**
- D. Certificates must show as ‘additional insured’ the Owner, **Oscoda Area Schools**, the Architect, **The Collaborative**, and the Construction Manager, **WOLGAST CORPORATION**.
- E. A “Letter of Compliance” must be completed and submitted along with the certificate of insurance. The “Letter of Compliance” form is Page 3 of this section.
- F. **Insurance certificates must be completed as follows: (please refer to corresponding numerals on the sample certificate (following instructions) and also reference the “Section 00700 - General Conditions of the Contract for Construction.”**
1. This blank is to be dated the date the certificate of insurance is issued.
  2. This blank is to provide the complete name and address of the insurance agency issuing the certificate.
  3. This blank is to provide the full name and address of the “prime contractor.”
  4. These blanks are to provide the name (or names) of the insurance company (ies) providing coverage for the specific coverage issued on the certificate.
  5. General Liability
    - a. General Liability – All blanks must be checked in this section and policies must be on an “occurrence” basis.
    - b. Policy Number – A policy number must be listed here.
    - c. Policy “effective” and “expiration” dates must be listed in these two blanks.
    - d. This section must be filled in with dollar amounts (listed in thousands). Please refer to the example on the following page.
  6. Automobile liability
    - a. These blanks must be filled in with either:  
Option 1: Any Auto, Hired, and Non-Owned automobiles OR  
Option 2: All Owned Autos (Priv. Pass.), All Owned Autos (Other than Priv. Pass.), Hired Autos, and Non-Owned Autos.
    - b. Policy Number – A policy number must be listed here.
    - c. Policy Effective and Expiration dates must be listed in these two blanks.
    - d. This Section must be filled in with dollar amounts (in thousands).
  7. Excess Liability (Provide \$2 million Excess Liability Umbrella policy):
    - a. This blank must be checked with the “Umbrella Form.”
    - b. Policy Number – A policy number must be listed here.
    - c. Policy Effective and Expiration dates must be listed in these blanks.
    - d. If this section is required (see Item 7 above), both of these blanks must be filled in with a minimum of \$2,000,000 and \$2,000,000.



8. Worker's Compensation
  - a. Nothing needs to be checked here.
  - b. Policy Number – A policy number must be listed here.
  - c. Policy Effective and Expiration dates must be listed in these blanks.
  - d. These blanks must be filled in with minimum limits as follows:
    - \$500,000 (each accident)
    - \$500,000 (disease policy limits)
    - \$500,000 (disease each employee)
9. This section need not be completed unless some unique coverage is required for a certain type of job.
10. This section should contain the listing of the additional insured as in 1.01D. The names of the Owner, Architect, and Construction Manager must be listed here.
11. The Owner should be listed here, as this is the actual Certificate Holder. List the Owner as follows:

**Oscoda Area Schools**

12. This blank must show the number thirty (30), indicating that the Owner and all additional insured parties will receive at least thirty (30) days' notice of cancellation of any of the policies listed on the certificate.
13. The certificate must be signed by a licensed insurance agent or representative of the insurance company in order to be valid.

***NOTE: Sample Certificate of Liability and Letter of Compliance follows.***



**Letter of Compliance**

Owner: \_\_\_\_\_

Contractor: \_\_\_\_\_

Project: \_\_\_\_\_

This letter is to acknowledge that I/We am/are the Insurance Agent(s) for the above-named Contractor and furthermore, that we have reviewed the insurance coverage required under this Contract with the Owner:

**Oscoda Area Schools**

We hereby certify that said Contractor is in compliance with all insurance coverage required under this Contract with the Owner referenced above.

We hereby certify that said Contractor is in compliance with all insurance requirements, whether or not so evidenced on the attached certificate of insurance.

**Signed:** \_\_\_\_\_

Agency: \_\_\_\_\_

Address: \_\_\_\_\_

Agent: \_\_\_\_\_

Witness: \_\_\_\_\_

Date: \_\_\_\_\_

Notary: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**For:** \_\_\_\_\_

Contractor: \_\_\_\_\_

Address: \_\_\_\_\_

Bid Division: \_\_\_\_\_



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
(1)

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  (2)	CONTACT NAME:		
	PHONE (A/C, No, Ext):	FAX (A/C, No):	
	E-MAIL ADDRESS:		
	INSURER(S) AFFORDING COVERAGE		NAIC #
INSURED  (3)	INSURER A :	(4)	
	INSURER B :		
	INSURER C :		
	INSURER D :		
	INSURER E :		

**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 (5A) <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR			(5B)		(5C)	EACH OCCURRENCE (5D) \$ 1,000,000.00 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000.00 MED EXP (Any one person) \$ 5,000.00 PERSONAL & ADV INJURY \$ 1,000,000.00 GENERAL AGGREGATE \$ 1,000,000.00 PRODUCTS - COMP/OP AGG \$ 1,000,000.00
	GENL AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:						
	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY (6A) <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> NON-OWNED AUTOS ONLY			(6B)		(6C)	COMBINED SINGLE LIMIT (Ea accident) (6D) \$ 1,000,000.00 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> OCCUR (7A) <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE			(7B)		(7C)	EACH OCCURRENCE (7D) \$ 2,000,000.00 AGGREGATE \$ 2,000,000.00
	DED    RETENTION \$						
	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY (8A) ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below			(8B)		(8C)	PER STATUTE    OTH-ER (8D) E.L. EACH ACCIDENT \$ 500,000.00 E.L. DISEASE - EA EMPLOYEE \$ 500,000.00 E.L. DISEASE - POLICY LIMIT \$ 500,000.00
	(9)						

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

(10) LIST THE OWNER, ARCHITECT AND CONSTRUCTION MANAGER AS ADDITIONAL INSURED

<b>CERTIFICATE HOLDER</b>  (11) INSERT THE OWNER'S NAME HERE  NOTE: PLEASE HAVE YOUR INSURANCE COMPANY MAIL THIS DOCUMENT TO THE CONSTRUCTION MANAGER	<b>CANCELLATION</b>  (12) 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  (13)
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ACORD 25 (2016/03)

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POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED - OWNERS, LESSEES OR  
CONTRACTORS - SCHEDULED PERSON OR ORGANIZATION**

This endorsement modifies insurance provided under the following:  
COMMERCIAL GENERAL LIABILITY COVERAGE PART

**SCHEDULE**

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

**A. Section II - Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

**B.** With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

**C.** With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - AUTOMATIC STATUS WHEN REQUIRED IN CONSTRUCTION AGREEMENT WITH YOU**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

**A. Section II - Who Is An Insured** is amended to include as an additional insured any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured.

However, the insurance afforded to such additional insured:

1. Only applies to the extent permitted by law; and
2. Will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

A person's or organization's status as an additional insured under this endorsement ends when your operations for that additional insured are completed.

**B.** With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

- a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
- b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional architectural, engineering or surveying services.

2. "Bodily injury" or "property damage" occurring after:

- a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
- b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as part of the same project.

**C.** With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

The most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement you have entered into with the additional insured; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

**ADDITIONAL INSURED - OWNERS, LESSEES OR  
CONTRACTORS - COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART  
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

**SCHEDULE**

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) And Description Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

**A. Section II - Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the

contract or agreement to provide for such additional insured.

**B.** With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

**END OF SECTION 00650**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Within fifteen (15) days following the date of the issue of the Notice to Proceed (Section 00500), each Contractor shall submit to the Construction Manager for delivery to the Owner, a Schedule of Values showing accurate costs for the elements of their Work.
- B. The Schedule of Values shall be typed or printed on Contractor's letterhead, identify the project and work division, and must be dated and signed.
- C. The Schedule of Values shall divide the Work into a sufficient number of individual cost elements to serve as an accurate basis for Contractor's Application for Payment.
- D. Each work element shall be listed identifying labor and material as separate line items. Each work element shall include its prorated share of profit, overhead, and retainage.

**1.02 SPECIAL ITEMS**

- A. As a part of the schedule of values the Contractor shall designate specific line items and associated values identified as:
  - 1. Performance Bond and Labor & Material Payment Bond (when required by Owner).  
Value: Actual Cost of Bonds
  - 2. Daily housekeeping and clean-up inclusive of any special cleaning and preparation required by the specification for delivering the building for the Owners occupancy.  
Value: Two percent (2%) of the total Contract Amount
  - 3. Retainage / Punch List  
Value: Ten percent (10%) of the total Contract Amount
- B. A request for payment of any special item amount contained in the Contractor's approved Schedule of Values or a portion thereof may be submitted for payment once the work for that item has been completed to the satisfaction of the Owner, Architect and Construction Manager
- C. Upon the completion of the Contractor's work exclusive of any punch list work, a Contractor may submit a separate Application for Payment requesting the Retention / Punch List line item be reduced to (5%). **This** request must be submitted to the Construction Manager along with a Partial Consent of Surety. Once received, the Construction Manager will forward to the Owner for approval and notify the contractor when fully executed. The Owner shall reserve the right to accept or reject all requests for Retention / Punch List reduction.
- D. The Schedule of Values shall be submitted and approved prior to Contract execution and receipt of any payment.
- E. **Absolutely NO CHANGES may be made to an approved Schedule of Values.**
- F. Increases or decreases in the Contract Amount shall be through change orders.
- G. Each Change Order shall be listed as a new line item on the Contractor Invoicing Form.

**END OF SECTION 00670**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Within fifteen (15) days following the date of the issue of the Contract, each Contractor shall submit to the Construction Manager for delivery to the Owner, a list of all subcontractors that they intend to utilize in their performance of the Work, and all suppliers who will be providing materials and/or equipment to be incorporated into the Work.
- B. All SUBCONTRACTORS' names, addresses, telephone numbers, and types of Work shall be included on the list.
- C. All SUPPLIERS' names, addresses, telephone number, and items provided shall be included on the list.
- D. All items of material and equipment include in the Work shall be listed. Each items shall be listed with its manufacturer, supplier, and installing subcontractor, if applicable.
- E. Subcontractor / Supplier / Material / Equipment listings shall be submitted prior to contract execution.
- F. Prior to award of a contract, the Construction Manager will notify the contractor if the Owner has reasonable and substantial objection to any person, organization, material and/or equipment listed by the Contractor. If the Owner has a reasonable and substantial objection, the Contractor shall amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute or they may disqualify the Proposal.
- G. **Suppliers, Subcontractors, Material, and Equipment proposed by the Contractor and accepted by the Owner shall be used in the Work for which they are proposed and accepted, and shall not be changed except with prior written approval by the Construction Manager and Owner.**

**END OF SECTION 00680**



**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Within fifteen (15) days following the date of issue of a Contract, each Contractor shall submit to the Construction Manager, for delivery to the Owner, a list of all supervisory employees whom the Contractor proposes to employ to accomplish the Work.
- B. This list shall include supervisory employees' names, titles, and duties.
- C. Employee listings shall be submitted prior to contract execution.

**1.02 OWNER'S APPROVAL**

- A. Contractors are required to establish, to the satisfaction of the Owner, the reliability and responsibility of proposed employees.
- B. Prior to the award of a contract, the Construction Manager will notify the Contractor if the Owner has reasonable and substantial objection to any person listed by the Contractor. If the Owner has reasonable and substantial objection, the Contractor may amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute or they may disqualify the Proposal.
- C. Employees proposed by the Contractor and accepted by the Owner shall be employed on the Work for which they are proposed and accepted and shall not be changed except with written approval of the Owner.

**END OF SECTION 00690**

**PROJECT  
GENERAL CONDITIONS  
OF THE CONTRACT FOR  
CONSTRUCTION ON  
FOLLOWING PAGE(S)**

END OF SECTION 00700

 **AIA** Document A232<sup>®</sup> – 2019**General Conditions of the Contract for Construction, Construction Manager as Adviser Edition****for the following PROJECT:**

*(Name, and location or address)*

Oscoda Area Schools, 2024 Sinking Fund and School Bond Construction Program – including erecting, furnishing, and equipping a new community center building; remodeling, furnishing and refurnishing, and equipping and re-equipping the auditorium and existing school buildings; erecting an addition to an athletic support building; acquiring and installing instructional technology and instructional technology equipment for school buildings; and developing, equipping, and improving playgrounds, athletic fields and facilities, parking areas and sites; all in accordance with the relevant application for preliminary qualification of bonds, the approved project scopes, applicable laws, the applicable plans and specifications, the Owner’s fixed budget, and as otherwise approved by the Owner.

**THE CONSTRUCTION MANAGER:**

*(Name, legal status, and address)*

Wolgast Corporation  
4835 Towne Centre Road, Suite 203  
Saginaw, Michigan 48604  
Telephone: (989) 790-9120  
Facsimile: (989) 790-9063

**THE OWNER:**

*(Name, legal status, and address)*

Oscoda Area Schools  
3550 East River Road  
P.O. Box 694  
Oscoda, Michigan 48750  
Telephone: (989) 739-2033  
Facsimile: (989) 739-2325

**THE ARCHITECT:**

*(Name, legal status, and address)*

The Collaborative  
213 South Main Street, Suite 200  
Ann Arbor, Michigan 48104  
Telephone: (734) 922-8002  
Facsimile: N/A

**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.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	OWNER
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5	SUBCONTRACTORS
6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
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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 as to contractors, the Contract Documents also include the advertisement or invitation to bid, Instructions to Bidders, other information furnished by the Owner in anticipation of receiving bids or proposals, Owner-accepted portions of the Contractor's bid or proposal, and portions of addenda relating to bidding or proposal requirements but do not include sample forms. The Architect's execution of the Owner/Architect Agreement and the Construction Manager's execution of the Owner/Construction Manager Agreement shall constitute their acceptance of all terms herein related to the respective parties.

§ 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 the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their 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. The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and that the Contract Documents include work (whether or not shown or described) which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the construction industry.

§ 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 other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 **Contractors.** Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 **Separate Contractors.** Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 **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.

§ 1.1.8 **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.

§ 1.1.9 **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.

§ 1.1.10 **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 be liable for results of interpretations or decisions rendered in good faith and without negligence.

§ 1.1.11 **Products.** The term "Product(s)" as used in the Contract Documents refers to the materials, systems, and equipment provided by the Contractor for use in the Work of the Project.

§ 1.1.12 **Warranty.** The terms "Warranty" and "Guarantee" as used in the Contract Documents shall have the same meaning and shall be defined as "legally enforceable assurance of satisfactory performance or quality of a product or Work".

§ 1.1.13 **Materials.** Where materials, systems, and equipment items are referred to in the singular, such reference shall not serve to limit the quantity required. The Contractor shall furnish quantities as required by the Contract Documents to complete the Work. Unless specifically limited in the Contract Documents, the words "furnish", "install", and "provide", or any combination thereof mean to furnish and incorporate into the Work, including all necessary labor, materials, and equipment and other items required to perform the Work indicated.

§ 1.1.14 **Project Manual.** The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

## § 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. Where responsibility for particular Work is required of the Contractor, the Contractor shall not be released from that responsibility by reason of the specification or drawing which establishes the responsibility. Thus, the Contractor shall be responsible for all Work required of it, even though that responsibility may be shown only in that portion of the documents typically pertaining to another contractor or 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.

§ 1.2.4 If there should be a conflict between two or more of the Contract Documents then the following order of interpretation shall apply:

- .1 Where requirements specifically set forth in the applicable Agreement are in conflict with other Contract Documents, including but not limited to these General Conditions, the Agreement shall govern.
- .2 In all other instances, the conflict shall be resolved by complying with the provision that is most favorable to the Owner (as determined by the Owner in the Owner's sole discretion).
- .3 When a duplicate of material or equipment occurs in the Drawings, the Specifications or other Contract Documents, each Contractor shall be deemed to have bid on the basis of each furnishing such material or equipment. The Owner, with the assistance of the Architect and Construction Manager, will decide which Subcontractor(s) shall furnish the same.

### § 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 Unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, 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 unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, the Architect and respective consultants will 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 national overnight courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement. Further, any other written notice delivered with a written acknowledgement or receipt shall be deemed duly served, regardless of method.

Wherever the Contract Documents require the Contractor to give "Notice" or "Timely Notice" to the Architect, Public Authority, and/or others, it shall be the Contractor's responsibility to furnish all such notices sufficiently in advance to allow the party receiving the notice reasonable time to react to such notice, including travel time on the job site as necessary, when such notices require the on-site presence of the Architect, Public Authority, their authorized representatives, or others for field observation of inspections, testing or approvals. Reasonable time shall be defined as no less than 24 hours plus normal travel time from the home office of the party being notified to the job site and must also accommodate known, standard, or reasonable processing periods.

§ 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 may agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties may use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

*(Paragraphs deleted)*

## 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 subject to parameters of authority established by Owner's board of education. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

*(Paragraph deleted)*

### § 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's information is "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, but not limited to, 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. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located, if licensed architecture is required by law for the Project. 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. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

§ 2.3.3 The construction manager adviser is lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.



§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 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. Taking into account the Contractor's experience and expertise, and exercise of professional caution, 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. The Contractor shall not be entitled to additional compensation resulting from its failure to confirm the location of the site utilities or existing structures prior to bid opening.

§ 2.3.6 Upon specific written request of the Contractor, 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. Contracts with other Contractors alone shall not constitute sufficient Owner control for purposes of this section.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Contractor will receive at least one copy of the Contract Documents in pdf format (or another format reasonably approved by the Owner) for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

#### § 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 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. This right shall be in addition to and not in limitation of the Owner's rights under any provision of the Contract Documents.

#### § 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 three-day period after receipt of notice from the Owner or the Owner's designee (or immediately in the case of a threat to the safety of persons or property) 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, including any claim against the Contractor's Performance Bond, correct such default or neglect. In such case, the Owner may deduct from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses, including any and all legal expenses incurred to effectuate and enforce this provision and compensation for the Construction Manager's and Architect's and their respective consultants' 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.

If the Architect, Construction Manager, Owner, or other contractors or consultants are required to provide additional services due to defects or deficiencies in the Contractor's work or by failure of the Contractor to perform under its agreement, the Contractor shall be responsible for all such costs and fees (including attorney fees), which shall promptly be paid to the Owner. The Owner, Contractor, Architect, and Construction Manager acknowledge that the Owner's receipt of such payment from the Contractor is a condition precedent to the Owner's obligation to make payment to those adversely affected.

This Section 2.5 allows the Owner to withhold payments from a non-performing Contractor irrespective of the termination procedure identified in Section 14.2, and the Owner may pursue either remedy, or both.

## 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.

§ 3.1.1.1 Possession, sale, or consumption of alcoholic beverages on the construction site is strictly prohibited. The unlawful manufacture, distribution, dispensation, possession or use of drugs is prohibited on the construction site.

§ 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 Construction Manager or Architect in their 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 2.3.5, 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 Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and 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 Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and 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.

§ 3.2.5 Prior to submitting its bid, the Contractor shall have studied and compared the Contract Documents and shall have reported to the Architect any error, inconsistency, or omission in the Contract Documents related to its work. It will be presumed that the Contractor's bid and the Contract Sum include the cost of correcting any error, inconsistency, or omission, which could have been discovered by the exercise of reasonable diligence. Unless the Contractor establishes that such error, inconsistency, or omission could not have been discovered by the exercise of

reasonable diligence, the Contractor will make such corrections without additional compensation so that the Work is fully functional.

### **§ 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, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures, specifically including any delays that could impact timely coordination and completion of the Work. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. The Contractor shall immediately notify the Construction Manager of delays of other contractors that could impact timely coordination and completion of the Work.

**§ 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 the Project 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. Such provision of labor and materials shall occur in sufficient time to satisfy the existing Project schedule. The Contractor bears the risk of any failure to timely provide such labor and materials for any reason. The Contractor agrees to execute the appropriate UCC forms to effectuate the Owner's ownership of the material and equipment furnished pursuant to this Agreement.

**§ 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, in consultation with the Construction Manager, 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.

**§ 3.4.4** The Contractor, Construction Manager, and Architect each respectively agree that neither they nor their subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this contract, with respect to hire, tenure, conditions or privilege of employment, or any matter directly or indirectly related to employment, because of race, age, sex, color, religion, national origin, ancestry or physical disability. Breach of this covenant may be regarded as a material breach of this contract.

### **§ 3.4.5 Asbestos-Free Product Installation**

**§ 3.4.5.1** It is hereby understood and agreed that no product and/or material containing asbestos including chrysolite, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the Work by the contractor or his employees, agents, subcontractors, or other individuals or entities over whom the Contractor has

control. If applicable, the Contractor shall be required to provide a signed certification statement ensuring that all products or materials installed or introduced into the work all be asbestos-free.

**§ 3.4.5.2** The Contractor shall also be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the requirements of Section 3.4.5.1.

**§ 3.4.5.3** The Contractor shall complete and submit to the Owner a certification evidencing asbestos-free product installation prior to issuance of the final Certificate for Payment, in a form acceptable to the Owner.

### **§ 3.5 Warranty**

**§ 3.5.1** In addition to any other warranties, guarantees or obligations set forth in the Contract Documents or applicable as a matter of a law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

- .1 The Owner will have good title to the Work and all materials and equipment incorporated into the Work and, unless otherwise expressly provided in the Contract Documents, will be of good quality and new;
2. The Work and all materials and equipment incorporated into the Work will be free from all defects, including any defects in workmanship or materials;
3. The Work and all equipment incorporated into the Work will be fit for the purpose for which they are intended;
4. The Work and all materials and equipment incorporated into the Work will be merchantable; and
5. The Work and all materials and equipment incorporated into the Work will conform in all respects to the Contract Documents.

If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Work, materials, or equipment not conforming to these requirements may be considered defective.

Upon notice of the breach of any of the foregoing warranties or guarantees or any other warranties or guarantees under the Contract Documents, the Contractor, in addition to any other requirements in the Contract Documents, will commence to correct such breach within seventy-two (72) hours after written notice thereof and thereafter will use its best efforts to correct such breach to the satisfaction of the Owner; provided that if such notice is given after final payment hereunder, such seventy-two (72) hour period shall be extended to seven (7) days. The foregoing warranties and obligations of the Contractor shall survive the final payment and/or termination of the Contract.

The Contractor shall, at the time of final completion of the Work and as a condition precedent to final payment to the Contractor, assign to the Owner all manufacturers' warranties related to the materials and labor used in the Work. The Contractor further agrees to perform the Work in such manner as to preserve any and all such manufacturers' warranties and deliver to the Owner the warranties, project manuals, operating procedures, and other materials related to each of the building systems and materials included in the Contractor's Work and as required by the Specifications.

**§ 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 or portions thereof 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. The Contractor shall also pay all state and federal taxes levied on its business, income or property and shall make all contributions for social security and other wage or payroll taxes. The Contractor shall be solely responsible for such payments and shall hold the Owner harmless from same.

### **§ 3.7 Permits, Fees, Notices, and Compliance with Laws**

**§ 3.7.1** Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay 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 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 written and dated notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Owner and the Architect, in consultation with the Construction Manager, 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, they will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Owner and the Architect, in consultation with the Construction Manager, 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, Construction Manager, and Contractor, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, the Contractor shall submit a Claim as provided in Article 15. The requirements of Section 2 of 1998 PA 57 (MCL 125.1592), as amended, are hereby incorporated into this document. The Contractor shall be alert to any indication or evidence of existing underground or concealed utilities or structures not shown on the Contract Documents and shall immediately notify the Owner of discovery of such evidence. If the Contractor encounters such utilities or structures, it shall cease operations immediately to minimize damage and shall notify the Owner and Architect. The Contractor shall bear the cost of damage resulting from its failure to exercise reasonable care in its construction activity or from continuing operations without notifying the Owner.

§ 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 provide written and dated notification to the Owner, Construction Manager, 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 shall be made, as needed 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 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. The superintendent and any other personnel shall be satisfactory to the Owner in all respects, and the Owner shall have the right to require the Contractor to remove any superintendent or any other personnel from the Project whose performance is not satisfactory to the Owner and to replace such superintendent or other personnel with another who is satisfactory to the Owner.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. The Owner and/or the Construction Manager may reply within 14 days of receipt of the information, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review.

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

### § 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, and the Construction Manager's use in developing the Project schedule, 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. In no event shall the Contractor's Construction Schedule be extended due to action or inaction of the Contractor, except with prior written approval of the Owner within the Owner's sole discretion. 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. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 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 Owner's, Construction Manager's and Architect's approval which approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, (2) allow the Construction Manager and Architect reasonable time to review submittals, and (3) provide for expeditious and practical execution of the Work. 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 participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in accordance with the most recent approved project schedule and the most recent work schedule.

§ 3.10.5 The Contractor shall cooperate with the Construction Manager in scheduling and performing its Work to avoid conflict or interference with the Work of others, and the Contractor shall be responsible for any conflict or interferences that it causes. The Construction Manager and the Contractor acknowledge and understand that the work schedule will be modified from time-to-time with the Owner's approval to coordinate with the work of others and that such schedule changes do not give rise to a claim for damages or additional compensation by the Contractor for delay or otherwise. The Contractor shall be required to conform to the most recent Owner-approved schedule and acknowledges that fact was taken into account when it agreed to the Contract Sum and entered into this Contract.

§ 3.10.6 The Contractor shall cooperate with the Construction Manager in working out and following the proper sequence of operations between the Work of the Contractor and that of other trades on the site.

§ 3.10.7 The Contractor shall prosecute the Work undertaken in a prompt and diligent manner whenever the Work (or a part thereof) becomes available, or at such other time as the Owner and/or Construction Manager may direct so as to promote the general progress of the entire construction. The Contractor shall not, by delay or otherwise, interfere with or hinder the Work of the Construction Manager or any other Contractor. Any materials that are to be furnished by the Contractor shall be furnished in sufficient time to enable the Contractor to perform and complete its Work within the time or times provided in the schedule. If the Contractor shall, through its action or inactions, including the actions or inactions of its' subcontractors or suppliers, fall behind in furnishing necessary labor and/or materials to meet the construction needs in accordance with the established schedule, then it shall increase its forces or work such overtime as may be required, at its own expense, to bring its part of the work up to the proper schedule. In the event that the Contractor does not take such action necessary to bring its part of the work up to schedule, as determined by the Construction Manager, then the Owner may supplement the Contractor's forces or take other action permitted under Section 2.4 or Section 2.5. The Contractor shall be responsible for any and all costs of performing or completing the Work and shall pay any such sums within ten (10) days of an invoice. If not paid within ten (10) days, the amount will be withheld from the Contractor's next payment and paid to the relevant parties. If the amounts withheld from payments then or thereafter due Contractor are insufficient to cover such costs, the Owner may bill these costs to the Contractor, and the Contractor shall pay any such sums within ten (10) days of an invoice. Exercise of such rights shall in no way limit or jeopardize the Owner's right to any other remedy, including but not limited to a claim against the Performance Bond of the Contractor.

### § 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 Construction Manager, Architect, and Owner, and delivered to the Construction Manager 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 for submittal to and review by the Architect to illustrate materials or equipment for some portion of the Work. All Work shall be furnished and installed in accordance with the Drawings, Specifications and as additionally required by the manufacturer's printed instructions. The Contractor shall review the manufacturer's instructions, and where conflict occurs between the Drawings or Specifications and the manufacturer's instructions, the Contractor shall request clarification from the Architect prior to commencing 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 and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are 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 Construction Manager or Architect without action.

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

The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, 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 reviewed and 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 review and approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in a detailed writing 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 Construction Manager and 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 reasonably rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents subject to its experience and expertise. 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 shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals. The Architect and Construction Manager shall be entitled to reasonably rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, subject to their professional judgment, experience, and expertise. 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. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect. Only materials and equipment which are to be used for the Project or to carry out the Work shall be stored at the Project site(s). Protection of such materials and equipment shall be the sole responsibility of the Contractor.



### **§ 3.13 Use of Site**

**§ 3.13.1** The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Only materials and equipment which are to be used for the Project or to carry out the Work shall be stored at the Project site(s). Protection of such materials and equipment shall be the sole responsibility of the Contractor.

**§ 3.13.2** The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

### **§ 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, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor and its Subcontractors 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, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

**§ 3.15.3** Any areas and/or concurrently occupied space both occupied by the Owner and used in the progress of the Work, whether within the limits of the construction site or the adjacent areas leading to it, shall be maintained in a clean and safe condition and open to travel. Failure by the Contractor to maintain said areas will result in the Owner's cleaning of same, at the expense of the Contractor.

### **§ 3.16 Access to Work**

The Contractor shall provide the Owner, Construction Manager, 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 indemnify and hold harmless the Owner, Construction Manager, and Architect from any and all cost, damage, and loss on account thereof, including, but not limited to actual attorneys' fees, 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, Architect, or Construction Manager. 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 through the Construction Manager. The review by the Owner of any method of construction, invention, appliance, process, article, device or materials of any kind shall be for its adequacy as integrated into the Work and shall not be an approval for the use thereof by the Contractor in violation of any patent or other rights of any third person.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of

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any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or in any way related to performance of the Work, or the duties or obligations of this Agreement or the failure of the Contractor or the Work to conform with the Contract Documents, caused in whole or in part by any acts or omissions of the Contractor, a Subcontractor, or anyone directly or indirectly employed by them or anyone for whose acts of any of them may be liable. The Contractor shall not be obligated to indemnify a party for that party's sole negligence but shall remain liable to the fullest extent of its fault or the fault of a person for whom the Contractor is responsible (e.g., a Subcontractor). The Contractor shall be responsible to the Owner, Construction Manager, Architect, Architect's consultants and agents and employees of any of them from and against all amounts such parties may be required to pay in attorney fees in order to pursue enforcement of this provision against the Contractor or otherwise obtain indemnification from the Contractor provided under the terms of this Section 3.18 or any other applicable Contract Document. Such obligation shall not be construed to negate, abridge or reduce any other rights or obligations of indemnity which would otherwise exist as to any party or person set forth in this section. To the fullest extent permitted by law, the Contractor shall indemnify the Owner and save the Owner harmless against all loss by fines, penalties or corrective measures resulting from negligent or wrongful acts or omissions by the Contractor, its Subcontractors, agents, employees or assigns, with respect to the violation of safety requirements of this Contract, including reasonable attorney fees.

**§ 3.18.2** In addition to and not in limitation of the Contractor's other indemnity obligations, the Contractor hereby accepts and assumes exclusive liability for and shall indemnify and save harmless the Owner, Construction Manager and Architect from and against the payment of the following:

All contributions, taxes, or premiums (including interest and penalties thereon) which may be payable under the unemployment insurance law of any state, the federal Social Security Act, federal, state, county and/or municipal tax withholding laws, or any other law, measured upon the payroll of or required to be withheld from employees by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

All sales, use, personal property and other taxes (including interest and penalties thereon) required by any federal, state, county, municipal or other law to be paid or collected by the Contractor or any of its Subcontractors or vendors or any other person or persons acting for, through or under it or any of them, by reason of the performance of the Work or the acquisition, ownership, furnishing, or use of any materials, equipment, supplies, labor, services or other items for or in connection with the Work;

All pension, welfare, vacation, annuity and other benefit contributions payable under or in connection with respect to all persons by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

The Contractor shall indemnify and hold the Owner harmless from any claim, damage, loss or expense, including but not limited to actual attorney fees, incurred by the Owner related to any hazardous material or waste, toxic substance, pollution or contamination brought into the Project site or caused by the Contractor or used, handles, transported, stored, removed, remediated, disturbed or dispersed of by Contractor.

**§ 3.18.3** In the event that any claim is made or asserted, or lawsuit filed for damages or injury arising out of or resulting from the performance of the Work, whether or not the Owner is named as a party, the Contractor shall immediately advise the Owner, in writing, of such claim or lawsuit and shall provide a full and complete copy of any documents or pleadings thereto, as well as a full and accurate report of the facts involved.

## **ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER**

### **§ 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. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

**§ 4.1.2** The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

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

#### § 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment and with the Owner's written concurrence during the correction period. The Construction Manager and 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 more frequently, as agreed with the Owner or as required by law, 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. Subject to the Owner/Architect Agreement, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, will guard the owner against defects and deficiencies in the work, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents, the Project schedule and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule and shall supervise construction as required by 1937 PA 306 (MCL 388.851 et seq.).

§ 4.2.5 The Construction Manager and Architect, except to the extent required by Section 4.2.4 or by 1937 PA 306 and/or 1980 PA 299, as applicable, will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the Contractor's safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. Except as required by their respective agreements with the Owner, neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents and neither will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work. The Construction Manager will schedule and coordinate the work of all Contractors on the Project, including the Contractors' use of the site. The Construction Manager will keep the Contractors informed of the Project Construction Schedule to enable the Contractors to plan and perform the Work in a timely manner.

§ 4.2.6 **Communications.** The Owner shall endeavor to communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall endeavor to include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall endeavor to promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants may be through the Architect. Communications by and with Subcontractors and suppliers may be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 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. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and 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 Construction Manager and 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. However, should the Construction Manager or Architect discover during the course of such review any inaccuracies, incompleteness, or other irregularities, they shall immediately notify the Owner of the same to determine an appropriate corrective course of action or notify the Contractor of the same to correct the irregularities.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 The Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner in good condition and reasonably organized upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 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 Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.19 Interpretations 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, the Architect will endeavor to secure faithful performance by Contractor, and will not be liable for results of interpretations so rendered in good faith and without negligence.

§ 4.2.20 The Architect's interpretations on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and acceptable to the Owner.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness given the particular circumstances. 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 other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors. The term "Subcontractor" shall also include material and equipment suppliers.

§ 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 Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish supplies, materials or equipment, including those fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager will notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. The

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Contractor shall remain, in all instances, jointly and severally liable to the Owner for all acts or omissions of its Subcontractor. All contractual agreements with additional persons or entities serving as a subcontractor shall incorporate the Contract Documents, expressly identify the Owner as a third-party beneficiary, give the Owner all rights against the Subcontractor that it would have against the Contractor and state that the Owner shall enjoy all third-party beneficiary rights not prohibited by law.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager 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, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager 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, Construction Manager or Architect makes reasonable objection to such substitution. The Contractor shall notify the Owner, the Architect, and the Construction Manager of any proposed subcontractor substitution a minimum of 10 days prior to such proposed change.

### § 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, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager 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 may be equitably adjusted as negotiated by the parties.

§ 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.

## ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

### § 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 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. The Construction Manager and Contractor shall be responsible for coordinating the Work with the work of other Contractors, including the Owner's own forces or Separate Contractors so as to complete the Work in accordance with the Project schedule.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

*(Paragraph deleted)*

### § 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other 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's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and 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 or other Contractors' 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 Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities 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, Construction Manager, Separate Contractors, or other Contractors as provided in Section 10.2.5. Should a claim be made that the Contractor wrongfully delayed or caused damage to the Work or property of another contractor (including the Owner's own forces, other Contractors, or Separate Contractors), the Contractor shall promptly settle the dispute with such other contractor. If such other contractor sues the Owner on account of any delay or damage alleged to have been caused by the Contractor, the Construction Manager will notify the Contractor who shall defend such proceedings at the Contractor's sole expense. If any judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all costs, including attorneys' fees and court costs, which the Owner may have incurred.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors 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, other 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 allocate the cost among those responsible. The Owner's right to clean up shall in no event be deemed a duty, and should the Owner choose not to pursue this remedy, the Contractor necessitating such action shall remain fully responsible for the same.

## 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, only by Change Order, Construction Change Directive, written contract amendment, 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, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager 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

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, 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.

§ 7.2.3 The Contractor's agreement on any Change Order shall constitute its final settlement of all matters relating to the direct and indirect costs associated with such change and any and all related adjustments to the Contract Sum and the Contract Time.

### § 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager 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 or more 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 Construction Manager shall determine, with the Owner's approval, 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 Construction Manager 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 a reasonable amount of 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 Construction Manager and 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 Construction Manager 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. Contractor agreements to a Construction Change Directive shall require a follow-up writing or signature as contemplated in Section 7.3.7.

§ 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 Construction Manager and 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 undisputed Work completed under the Construction Change Directive in Applications for Payment. For those undisputed portions, the Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost, if agreed to by the Owner in writing, 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 in writing with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments in writing, such agreement shall be effective immediately and the Construction Manager shall 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 Owner and Construction Manager 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 Owner and Construction Manager 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 obtaining all supplies, materials, tools and equipment necessary to perform the Work and for properly 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. All work shall be completed in sufficient time to allow for clean-up and preparation for Owner move-in prior to the date of Substantial Completion.

## § 8.3 Delays and Extensions of Time

§ 8.3.1 Provided the Contractor submits a written request for an extension not more than fourteen days after the occurrence that gives rise to the delay, 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, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by fire, government-declared emergencies, 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 litigation, mediation, or arbitration, as applicable; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time may be extended by Change Order. Failure of the Contractor to submit a timely request for an extension shall irrevocably waive the Contractor's right to such an extension of time. If the contract time is subject to extension pursuant to this subparagraph, such extension shall be the exclusive remedy of the Contractor and the Contractor shall not be entitled to recover damages from the Owner. Further, minor modifications in Contract time resulting from adjustments in the Project construction schedule shall not be deemed a sufficient cause for an extension of time under this Section.

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

*(Paragraph deleted)*

## § 8.4 Delay Damage Claims

§ 8.4.1 If the Contractor fails to complete its Work on time resulting in loss or damage to the Owner, the Owner shall be entitled to recover any damages caused by the Contractor's breach, including overhead, profit, extended general conditions, actual attorney fees, etc.

§ 8.4.2 In the event the Contractor is delayed or hindered in the commencement or progress of the Work, including but not limited to those delays caused by the Work or lack of Work of another contractor or subcontractor on the Project, and the Contractor claims monetary damages as a direct and proximate consequences thereof (including, but not limited to, extended general conditions, overhead, profit, overtime, interest, supervisions or other costs or profits whatsoever), then the Contractor shall not assert such claims against the Architect, Construction Manager or Owner and, as to the Architect, Construction Manager and Owner, the Contractor's claims of such delay damages are hereby waived. The Contractor's sole and exclusive remedy regarding claims for monetary delay damages shall be to pursue such claims directly against any contractor(s) and/or subcontractors on the job which may have caused the delay, and with regard to such claims asserted against the Contractor by any other contractor(s) and/or subcontractors, the Contractor hereby waives the defense of absence of contractual privity and hereby assumes liability to other contractor(s) and/or subcontractors arising out of the Contractor's actions or inactions resulting in such delay and claim.

§ 8.4.3 For any delay claims raised against the Owner, the Contractor's sole and exclusive remedy is an extension of time to perform the Work not to exceed the time frame of any proven delay. Under no circumstances is the Contractor entitled to monetary delay damages from the Owner.

## 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, unless the Contractor provided such unit prices as a part of a competitive bid.

### § 9.2 Schedule of Values

Before the first Application for Payment, the Contractor shall submit a schedule of values 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 Construction Manager and the Architect. This schedule, unless objected to by the Owner, Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Owner and Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or 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 fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values 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, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien 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 Construction Manager and Architect, but not yet included in Change Orders. A Contractor's request for payment of sums related to work regarding Construction Change Directive shall, unless qualified in writing at the time of request, constitute full and complete consent to the Construction Change Directive(s) and to the issuance of a Change Order.

§ 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.

§ 9.3.1.3 The Contractor shall submit with each monthly Application for Payment (1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous application was submitted and the Owner might in any way be responsible have been paid or otherwise satisfied, and (2) a release or waiver of liens arising out of the Contract from each Contractor and/or Subcontractor, materialman, supplier and laborer or the Contractor addressing all previous Applications for Payment submitted for the Project.

§ 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. Payment to Contractor for materials stored off site is discouraged. When circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Owner and Construction Manager for approval to include such material costs in its next progress payment. The Contractor's request shall include the following information:

- .1 A list of the fabricated materials consigned to the Project (which shall be clearly identified, giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.
- .2 Certification that items have been tagged for delivery to the Project and that they will not be used for another purpose.
- .3 A letter from the Contractor's Surety indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party of their responsibility to complete the Work.
- .4 Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.
- .5 Costs incurred by the Owner, Construction Manager and Architect to inspect material in off-site storage shall be paid by the Contractor.
- .6 Subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in off-site storage.
- .7 When a partial payment is allowed on account of material delivered on the site of the Work or in the vicinity thereof or under possession and control of the Contractor, but not yet incorporated therein, such material shall become the property of the Owner, but if such material is stolen, destroyed or damaged by casualty before being used, the Contractor will be required to replace it at its own expense.

**§ 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** Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

**§ 9.4.2** Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

**§ 9.4.2.1** Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors. As between the Owner and the Contractor, the failure of the Architect or Construction Manager to notify the Contractor or the Owner of a withheld certification does not render such withholding ineffective, and the Owner shall have no

obligation to pay a Contractor for uncertified amounts or amounts for which no Certificate for Payment has been issued. If the Contractor does not receive notice of a withheld certification, it shall proceed as provided in Section 9.7.

**§ 9.4.3** The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager'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, or Contractors are, entitled to payment in the amount certified.

**§ 9.4.4** The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation 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, or Contractors are, entitled to payment in the amount certified.

**§ 9.4.5** The representations made pursuant to Sections 9.4.3 and 9.4.4 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 Construction Manager or Architect, in writing, together with the Certification which the qualification pertains.

**§ 9.4.6** The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has, unless otherwise required by contract or law, (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 Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or 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 or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied, or the Contractor is in breach of the Agreement;
- .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 or other 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;
- .7 failure to carry out the Work in accordance with the Contract Documents.
- .8 the Work not having progressed to the extent set forth in the Application for payment; or
- .9 representations of the Contractor are untrue.

§ 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 or Construction Manager withholds certification for payment under Section 9.5.1, 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 Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 If the Contractor disputes any determination by the Owner, Architect, or Construction Manager with regard to any Certificate for Payment, the Contractor shall nevertheless continue to expeditiously perform the Work and such dispute shall provide no basis for any manner of suspension of the Contractor's performance of the Work.

### § 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project 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 Construction Manager and Architect.

§ 9.6.1.1 The Owner may, in its sole discretion, choose to make payments to Contractors through the Construction Manager. More particularly, the Owner may distribute funds to the Construction Manager for the Construction Manager to then provide payment to each respective and applicable Contractor. The Owner may discontinue this practice at any time in its sole discretion.

§ 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 Construction Manager 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 Owner, Construction Manager and Architect 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, Construction Manager 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 Owner may, in its sole discretion, after providing Contractor with ten (10) days prior written notice, make direct payments to the Contractor's Subcontractors, material men, laborers or claimants relating to labor or material provided to the Contractor in the event the Subcontractors, material men, laborers or claimants threaten to or actually cease providing labor and/or materials for the Project due to nonpayment such that, in the Owner's determination, progress of the Project and the Project's schedule are jeopardized. All payments made pursuant to this section shall be considered the same as if paid directly to the Contractor and shall constitute partial payment of the Contract Sum. In the event the Contractor disagrees with the amount proposed to be paid to one or more Subcontractors, material men, laborers or claimants, the Contractor shall provide a bond in the amount the Contractor believes the Owner will overpay, within ten (10) days of receipt of notice, or be barred from making any claim that the amount of the direct payment was incorrect. Payment under this provision shall not jeopardize any other remedy available to the Owner.

§ 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.

§ 9.6.9 Subject to applicable law, if a petition in bankruptcy or any other arrangement or proceeding regarding insolvency, assignment for the benefit of creditors, trust, chattel mortgage, or similar state or federal proceeding, whether voluntary or involuntary, shall be filed with respect to the Contractor, the Owner may withhold the final balance, or any other payments, whether or not an application for progress payment has been properly filed, until expiration of the period of any guarantees or warranties required for the Contractor, and the Owner may pay out such funds the amount necessary to satisfy any claims or costs that otherwise would have been covered by such guarantees or warranties.

#### § 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor and without justifiable basis under the Contract Documents, within fourteen days after the Construction Manager's 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 Construction Manager and Architect or awarded by binding dispute resolution, unless the Owner, in good faith, disputes the amount certified, then the Contractor may, upon twenty-one additional days' notice to the Owner, Construction Manager and Architect, stop the Work until (1) the Contractor receives payment of the amount owing, or (2) the Contractor receives notice from the Architect, Construction Manager, or Owner of a full or partial withheld certification as provided herein. 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. The Owner shall have no obligation to pay the Contractor unless it receives a Certificate for Payment for the amount certified. The Owner may withhold payment from a non-performing Contractor irrespective of the issuance of a Certificate for Payment.

#### § 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 and when all required occupancy permits, if any, have been issued, so 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 notify the Construction Manager, and the Contractor and Construction Manager shall jointly 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 list, the Architect, assisted by the Construction Manager, 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 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 immediately. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, 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.

§ 9.8.6 Notwithstanding Sections 9.8.1 and 9.8.2, as a condition precedent to establishing the date of Substantial Completion, the Contractor shall prepare and submit to the Architect and Construction Manager a comprehensive list of items to be completed or corrected (a "punch list"). The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Should the Contractor fail to make corrections in a timely fashion, but not later than thirty (30) calendar days from the date of Substantial Completion or notification of the required corrections, whichever is earlier, such Work may be corrected by the Owner at the Contractor's sole expense, and the Contract Sum may be adjusted accordingly.

#### § 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. The Contractor shall proceed with the work in such a manner as reasonably directed and shall cooperate with the Owner to limit interruptions.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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 completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their 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 Construction Manager's and Architect's final Certificate for Payment or Project 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 through the Construction Manager (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) an affidavit that states the Work is fully completed and performed in accordance with the Contract Documents and is satisfactory to the Architect and the Owner, (6) in the event of Contractor bankruptcy, at the Owner's option, an order entered by the court having jurisdiction of the Contractor's insolvency proceeding authorizing such payment, (7) a general release executed by the Contractor on a form provided by the Construction Manager, (8) all close-out documents and warranties have been provided in a reasonable and acceptable manner, (9) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (10), 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 actual 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 Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and 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 through the Construction Manager 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  
*(Paragraphs deleted)*  
not constitute a waiver of any Claims by the Owner.

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

**§ 9.10.6** All architectural costs incurred after the specified Final Completion date resulting from the Contractor's failure to complete the Work as agreed shall be paid by the Contractor to the Owner prior to the authorization of final payment. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the current rate schedule in effect at the time of service, for services provided in connection with the Work. The architectural costs incurred after the final completion date will be deducted from the Contractor's progress payment or final payment as applicable.

## **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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

### **§ 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;

- .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; and
- .4 construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 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. The Contractor shall take all reasonable safety precautions with respect to its Work and the work of others, shall comply with all standard industry safety measures and shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority and all other requirements of the Contract Documents, including those applicable to the safety of persons or property. The Contractor shall be responsible for the safety of all of the Contractor's employees and the safety of all of the Contractor's Subcontractors, suppliers, and their employees. The Contractor shall report in writing to the Construction Manager any injury to any of Contractor's or its Subcontractors' employees at the site within one (1) day after the occurrence of such injury. The Contractor acknowledges receiving, or having access to an opportunity to review, health and safety information about the Project site(s), including any applicable asbestos management plan and any other environmental information it deems necessary to perform the work.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable, necessary, and appropriate 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. The Contractor shall be solely and fully responsible for any and all damage claims and for defense of all actions against the Owner relating to such explosives, hazardous materials and/or unusual methods.

§ 10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4. 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, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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, Construction Manager 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 the Contractor suffers injury or damage to person or property because of an act or omission of the Owner, or of others for whose acts the Owner is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the Owner within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the Owner to investigate the matter. The Contractor's failure to do so shall be an irrevocable waiver of any claim against the Owner arising out of such injury or damage. Injury or damage to persons or property suffered by the Owner because of an act or omission of the Contractor or others for whose acts the Contractor is legally responsible shall be subject to the limitations provisions established by Michigan law.

§ 10.2.8.1 The Contractor causing damage to the Work of another Contractor shall be responsible for the repair and replacement of such damaged Work. Back charges may be made against the Contract sum of the damaging Contractor when corrections are not made promptly.

§ 10.2.8.2 The Owner reserves the right to pay the Contractor suffering damage from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the Contract amount due the said responsible Contractor.

§ 10.2.9 If the Contractor or any Subcontractor chooses to use any systems, equipment, facilities, or services which have been incorporated in the Project as a permanent part thereof by any other, the Contractor shall assume full responsibility for damages caused to said systems, equipment, facilities or services, and have damages repaired as required, so that in no case will the performance of the used systems, equipment, facilities or services be diminished from the specified criteria as a result of such use.

§ 10.2.10 The Contractor acknowledges that the safety of the Owner's students, employees and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees and guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities. Without limiting the foregoing provisions, the Contractor shall comply with all laws applicable to students and/or school safety.

### § 10.3 Hazardous Materials

§ 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, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner in its discretion 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, as a courtesy, furnish in writing to the Contractor, Construction Manager 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. 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 to address shutdown, delay, and start-up.

*(Paragraph deleted)*

§ 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. To the extent the Contract requires the removal, transport and disposal of hazardous materials, the Contractor agrees that it assumes responsibility for said tasks as a part of the Agreement.

§ 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.

*(Paragraph deleted)*

### § 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's reasonable 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. Nothing in this section will be construed as relieving Contractor from the cost and responsibilities for emergencies covered hereby.

## § 10.5 Notification of Utility Companies

§ 10.5.1 At least five (5) working days prior to the start of work in areas which may involve existing utility lines, the Contractor shall notify the MISS DIG notification system of the planned work.

§ 10.5.2 The utility company should, upon receipt of notice, stake, mark or otherwise designate the location (and depth) of their lines, or temporarily move the line(s).

§ 10.5.3 The Contractor shall immediately report to the respective utility company any break or leak in its lines, or any dent, gouge, groove or other damage to the utility line or to its coating or cathodic protection made or discovered in the course of the Work.

§ 10.5.4 The Contractor shall immediately alert the Owner, Construction Manager, Architect and occupants of nearby premises of any and all emergencies caused or discovered in the utility lines(s) in the course of the Work.

## 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, as described elsewhere in the Contract Documents, as required by law, or as reasonably required by the Owner in light of the nature of services performed and insurance obligations of its other contractors and consultants. 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, Construction Manager and Construction Manager's consultants, and the 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. On all insurance contracts under which the Contractor is obligated to have its insurance company name the Owner as additional insured, the Contractor shall require such insurance company to add to the policy the following clause: "The insurance afforded to the Additional Insured is primary insurance. If the Additional Insureds have other insurance which is applicable to the loss on an excess or contingent basis, the amount of the insurance company's liability under this policy shall not be reduced by the existence of such other insurance." Certificates of insurance acceptable to the Owner shall be submitted by Contractor to the Owner and Construction Manager prior to commencement of Work and thereafter upon renewal or replacement of each required policy of insurance.

§ 11.1.2 The Contractor shall provide bonds covering faithful performance of 100% of the Contract and payment of 100% of the obligations arising thereunder as stipulated in bidding requirements or specifically required by the Contract Documents or by law on the date of the Contract. The Contractor shall provide such additional 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 and that are reasonably acceptable to the Owner. The Construction Manager shall obtain copies of the Performance Bond and Payment Bond required by the Agreement from the Contractor prior to Contractor beginning performance pursuant to the Agreement. The Contractor's obligation to provide such bonds shall not be waived in any fashion, including any failure to secure such bonds prior to Contractor beginning performance pursuant to the Agreement.

§ 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 directly to the Owner, and separately to the Construction Manager, 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 both the Contractor and the Construction Manager, separately and 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. The cost of the insurance shall be charged to the Owner by a Change Order.

§ 11.2.2.1 The Contractor shall at the Contractor's own expense provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work.

§ 11.2.2.2 The insurance required by Section 11.2 is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work, but not incorporated into permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance for owned or rented machinery, tools or equipment.

§ 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 directly to the Contractor, and separately to the Construction Manager, 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; and (2) the Contract Time and Contract Sum may be adjusted negotiation between the parties. 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 is not waiving any rights its insurer(s) may have to subrogation. To the extent any terms in the General Conditions or any other Contract Documents are contrary to the aforementioned, such terms shall be deemed void and unenforceable.

*(Paragraph deleted)*

## § 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.

## § 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. The Owner shall use its best efforts, with consultation of the Construction Manager, to reach a quick and fair settlement for all interested parties, with the insurance companies after a loss.

*(Paragraph deleted)*

## 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 Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request, with the Owner's consent, to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Owner shall reasonably adjust the Contract Sum and Contract Time as appropriate. At the time, Owner's consent is sought as described herein, the Architect and/or Construction Manager shall notify the Owner that additional costs may apply if the Work is in accordance with the Contract Documents. 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 Construction Manager or 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 Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If any portion of the Work is determined by the Owner, Construction Manager or Architect, either during performance of the Work or during any applicable warranty period, to be defective or not in compliance with the contract requirements, the Construction Manager or Owner shall notify the Contractor in writing that such Work is rejected. Thereupon, the Contractor shall immediately replace and/or correct such Work by making the same comply strictly with all the requirements therefor. The Contractor shall bear all costs of correcting such rejected Work, including work of other Subcontractors and including compensation for the Architect's and Construction Manager's additional services and any delay or related damage to the Owner made necessary thereby. The Construction Manager shall have the right to charge the Contractor for any compensation payable for the Architect's or Construction Manager's additional services required by the Contractor's rejected Work and deduct the payment from the next payment due the Contractor.

#### § 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 or Construction Manager to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner or Construction Manager shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager 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, Separate Contractors, or other 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.

§ 12.2.6 The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Failure to correct Work deficiencies and/or punch list items in a timely fashion shall be a substantial breach, and the Owner may terminate the Contract immediately without following the procedure identified in Section 14.2. As used in this Section 12.2.6, "timely" means the Contractor shall begin correction within three days of receiving the punch list or notice of work deficiency, and correction will be completed in a commercially reasonable time in accordance with the direction of the Construction Manager. Whether or not the Contract is terminated, if the Contractor fails to make corrections in a timely fashion, such Work may be corrected by the Owner, in its sole discretion, at the Contractor's expense and the Contract Sum may be adjusted by backcharge accordingly. The Contractor shall promptly notify the Construction Manager, in writing, when the Work deficiencies and/or punch list items are completed. Upon the review of the Work by the Construction Manager after such notification by the Contractor, if Work deficiencies and/or punch list items shall continue to exist, the Contractor shall reimburse any cost incurred by the Owner, including the Construction Manager's and Architect's fees for reinspections of the Work. Failure to pay such costs within ten (10) days of receipt of a demand regarding the same shall permit the Owner to withhold such amounts from the unpaid portion of the Contractor's contract.

### § 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. The acceptance of nonconforming Work by the Owner shall be by written Change Order, specifically referencing that it addresses nonconforming work, acceptable to the Owner's authorized representative, and signed by all parties. Acceptance of nonconforming Work may only occur pursuant to such written Change Order.

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 Governing Law

The Contract shall be governed by the law of the State of Michigan in all respects, except that claims and causes of action brought by the Owner shall not be deemed untimely if filed within six (6) years of substantial completion of the entire (and all) Project(s).

### § 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, Construction Manager, 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 Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and 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 Construction Manager, 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 Construction Manager and 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 Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and 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 Construction Manager's and 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 Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or 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 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.

§ 13.6 The Contractor agrees that time is of the essence and to start work when directed by the Construction Manager and to furnish sufficient materials and a sufficient number of properly skilled workers, so as not to delay the work of any other Contractor or completion of the Project.

§ 13.7 Notwithstanding any provisions within the Contract Documents, nothing shall be deemed a waiver of any immunity granted to Owner by law or statute, including but not necessarily limited to, governmental immunity under MCL 691.1407.

§ 13.8 The Owner, being a governmental unit, is protected by the Michigan Void Construction Contracts Act, MCL 691.991.

## 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 for reasons within the Owner's control 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, which may include 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
- .3 Because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents, subject to justifiable withholding of payment as described herein or 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, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and direct costs 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, for reasons within the Owner's controls and through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons 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, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3. The Contractor may not terminate the Contract unless it has submitted claims for the delays and sought an extension of time for each delay.

## § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials to the point of negatively impacting the Project and/or the related schedule;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents; or
- .5 fails to prosecute the Work or any part thereof with promptness and diligence or fails to perform any provisions of this Contract, or goes into bankruptcy, liquidation, makes an assignment for the benefit of creditors, enters into a composition with its creditors, or becomes insolvent.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, 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, three days' notice, terminate the Contractor's right to proceed with the Work, or such part of the Work as to which such defaults have occurred, and may take any one or more of the following actions;

- .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.

The notice required by this Section 14.2.2 shall not give the Contractor a right to cure defective Work or to cure other grounds for termination under Section 14.2.1. Further, the Owner's failure to strictly comply with the formal requirements of termination (e.g., by providing less than three days' notice of termination) shall not be a substantial breach by the Owner. The Owner may terminate the Contractor immediately if the Contractor endangers persons or property or has breached Project safety requirements).

In the event, the Contractor's surety bond requires notice of intent to declare a default of the Contractor and if such bond notice is provided by the Owner, such notice shall be adequate to satisfy the three (3) day written notice described above in this section.

§ 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 Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner in pursuing termination and completion of the Work, including actual attorney and legal fees and costs, 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, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, 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 the 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 this 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.

## 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, including but not limited to additional sums, additional time for performance, or damages for delay. 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. The Contractor shall not knowingly (as "knowingly" is defined in the Federal False Claims Act, 31 USC 3729, *et seq.*) present or cause to be presented a false or fraudulent Claim. As a condition precedent to making a Claim by the Contractor, the Claim shall be accompanied by an affidavit sworn to before a notary public or other person authorized to administer oaths in the State of Michigan and executed by an authorized representative of the Contractor, which states that: "The Claim which is submitted herewith complies with subparagraph 15.1.1 of the General Conditions, as amended, which provides that the Contractor shall not knowingly present or cause to be presented a false or fraudulent claim." Claims of the Owner shall be governed by the relevant Michigan statutory limitations period.

§ 15.1.2.1 Regardless of any provisions to the contrary, the statute of limitations with respect to any defective or nonconforming Work which is not discovered by the Owner shall not commence until the discovery of such defective or nonconforming Work by the Owner. See also Section 13.1.

#### § 15.1.2 Time Limits on Claims

The Owner shall commence all Claims and causes of action accordance with Section 13.1 and Section 15.1.21.1, regardless of any other time frames identified in this Agreement. The Contractor shall commence all claims and causes of action in accordance with Section 15.1 and, if shorter, any other provisions of this Agreement and Michigan law.

#### § 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the 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 written notice to the Owner and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor 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 Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.

§ 15.1.3.2 Claims by 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 written notice to the other party. In such event, no decision by the Initial Decision Maker is required. Claims by the Contractor under this Section 15.1.3.2 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.

#### § 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, including by mediation and/or litigation, as applicable, 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 undisputed payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time may be adjusted as mutually agreed by the Owner and Contractor. 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. Failure to provide such notice shall serve as an absolute bar against a claim for such an increase in the Contract Sum. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. A Project delay shall not be a basis for a Claim for additional cost. Delay claims against the Owner may be remedied only through an extension of time per Section 8.4.2 and Section 8.4.3.

#### § 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, additional notice as provided in Section 15.1.3 shall be given in addition to the general requirements for filing a claim. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work due to the increase in Contract Time sought. 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 waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes

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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 waiver is applicable, without limitation, to all consequential damages due to the Owner's termination of the Contractor in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages in favor of the Owner, 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 interpretation. The Architect will serve as the Initial Decision Maker. Except for those Claims excluded by this Section 15.2.1, an initial interpretation shall be required as a condition precedent to mediation or litigation of any Claim brought by the Contractor against the Owner. If an initial interpretation 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 an interpretation having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not interpret 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 interpret the Claim. Within ten (10) days of a written request, the Contractor shall make available to the Owner or its representative all of its books, records, or other documents in its possession or to which it has access relating to a Claim and shall require its subcontractors, regardless of tier, and materialmen to do the same.

§ 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, based on its interpretation, either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial interpretation approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial interpretation shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, 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 interpretation shall be subject to the parties' agreed upon binding dispute resolution process.

§ 15.2.6 Regardless of any other time frames identified herein, claims and causes of action brought by the Owner shall be governed in accordance with the statute of limitations periods under Michigan law, except for such longer periods of time as may be permitted in Section 13.1 and Section 15.1.2.1.

*(Paragraph deleted)*

## § 15.2.7 SURETY NOTICE AND PRIOR APPROVAL

Except where otherwise expressly required by the terms of the Agreement, the Contract Documents or the General Conditions, exercise by the Owner of any contractual or legal right or remedy without prior notice to or approval by the Contractor's surety shall in no way bar or prohibit the Owner's ability to pursue such right or remedy. Further, pursuit of such a right or remedy without prior notice to or approval of surety shall in no way compromise, limit or bar any claim by the Owner against a surety bond of the Contractor. The Owner's claims against a Contractor's surety bond shall be governed by Section 13.1 with respect to any limitations periods.

*(Paragraph deleted)*

### **§ 15.3 Mediation**

**§ 15.3.1** Except as otherwise agreed in writing by the parties, 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 commencement of the parties' agreed upon 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.

### **§ 15.3.3**

**§ 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.

*(Paragraphs deleted)*

### **§ 15.4 Consolidation or Joinder**

**§ 15.4.4.1** The Owner, at its sole discretion, may consolidate mediation conducted under this Agreement with any other mediation to which it is a party provided that (1) the mediation agreement governing the other mediation permits consolidation, (2) the mediations to be consolidated substantially involve common questions of law or fact, and (3) the mediations employ materially similar procedural rules and methods for selecting mediator(s).

**§ 15.4.4.2** The Owner, at its sole discretion, 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 mediation, provided that the party sought to be joined consents in writing to such joinder. Consent to mediation 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 Contractor further agrees to include similar dispute resolution provisions in all agreements with the independent contractors and consultants retained for the Project and to require all independent contractors and consultants also to include similar dispute resolution provisions in all agreements with subcontractors, all subconsultants, suppliers or fabricators so retained, thereby providing for a consistent method of dispute resolution between the parties to those agreements. Subject to the other limitations periods identified in these General Conditions which are understood to govern over this sentence, no demand for mediation shall be made after the date when the applicable statutes of limitations would bar legal or equitable proceedings. During the pendency of any mediation, all applicable limitations periods shall be tolled until the conclusion of that process.

The Owner reserves the right in its discretion to require consolidation or joinder of any mediation arising out of or relating to this Agreement with another mediation involving a person or entity not a party to this Agreement in any event the Owner believes such consolidation or joinder is necessary in order to resolve a dispute or avoid duplication of time, expense or effort. In the event the Owner is involved in a dispute which is not subject to mediation involving

a person or entity not a party to this Agreement, the mediation provisions applicable to the parties shall be deemed to be void and nonexistent in the event Owner, in its discretion, determines the Contractor should become a party to that dispute by joinder or otherwise. Any mediation hearing shall be held in the general location where the Project is located unless another location is mutually agreed upon.

**§ 15.4.5 Prevailing Wage.** This project is not subject to the prevailing wage rates and fringe benefit requirements of the Michigan Prevailing Wage Act, MCL 401.1101, et seq.

# **Additions and Deletions Report for** **AIA® Document A232® – 2019**

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 10:45:37 ET on 07/03/2024.

## **PAGE 1**

Oscoda Area Schools, 2024 Sinking Fund and School Bond Construction Program – including erecting, furnishing, and equipping a new community center building; remodeling, furnishing and refurbishing, and equipping and re-equipping the auditorium and existing school buildings; erecting an addition to an athletic support building; acquiring and installing instructional technology and instructional technology equipment for school buildings; and developing, equipping, and improving playgrounds, athletic fields and facilities, parking areas and sites; all in accordance with the relevant application for preliminary qualification of bonds, the approved project scopes, applicable laws, the applicable plans and specifications, the Owner’s fixed budget, and as otherwise approved by the Owner.

...

Wolgast Corporation  
4835 Towne Centre Road, Suite 203  
Saginaw, Michigan 48604  
Telephone: (989) 790-9120  
Facsimile: (989) 790-9063

...

Oscoda Area Schools  
3550 East River Road  
P.O. Box 694  
Oscoda, Michigan 48750  
Telephone: (989) 739-2033  
Facsimile: (989) 739-2325

...

The Collaborative  
213 South Main Street, Suite 200  
Ann Arbor, Michigan 48104  
Telephone: (734) 922-8002  
Facsimile: N/A

## **PAGE 3**

**§ 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, Agreement as to contractors, the Contract Documents ~~do not also~~ 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, ~~Owner-accepted portions of the Contractor's bid or proposal, or and~~ portions of addenda relating to bidding or proposal ~~requirements-requirements but do not include sample forms.~~ The Architect's execution of the Owner/Architect Agreement and the Construction Manager's execution of the Owner/Construction Manager Agreement shall constitute their acceptance of all terms herein related to the respective parties.

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**§ 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. The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and that the Contract Documents include work (whether or not shown or described) which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the construction industry.

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**§ 1.1.10 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.~~ faith and without negligence.

**§ 1.1.11 Products.** The term "Product(s)" as used in the Contract Documents refers to the materials, systems, and equipment provided by the Contractor for use in the Work of the Project.

**§ 1.1.12 Warranty.** The terms "Warranty" and "Guarantee" as used in the Contract Documents shall have the same meaning and shall be defined as "legally enforceable assurance of satisfactory performance or quality of a product or Work".

**§ 1.1.13 Materials.** Where materials, systems, and equipment items are referred to in the singular, such reference shall not serve to limit the quantity required. The Contractor shall furnish quantities as required by the Contract Documents to complete the Work. Unless specifically limited in the Contract Documents, the words "furnish", "install", and "provide", or any combination thereof mean to furnish and incorporate into the Work, including all necessary labor, materials, and equipment and other items required to perform the Work indicated.

**§ 1.1.14 Project Manual.** The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

...

**§ 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. Where responsibility for particular Work is required of the Contractor, the Contractor shall not be released from that responsibility by reason of the specification or drawing which establishes the responsibility. Thus, the Contractor shall be responsible for all Work required of it, even though that responsibility may be shown only in that portion of the documents typically pertaining to another contractor or trade.**

...

**§ 1.2.4** If there should be a conflict between two or more of the Contract Documents then the following order of interpretation shall apply:

- .1 Where requirements specifically set forth in the applicable Agreement are in conflict with other Contract Documents, including but not limited to these General Conditions, the Agreement shall govern.
- .2 In all other instances, the conflict shall be resolved by complying with the provision that is most favorable to the Owner (as determined by the Owner in the Owner's sole discretion).



.3 When a duplicate of material or equipment occurs in the Drawings, the Specifications or other Contract Documents, each Contractor shall be deemed to have bid on the basis of each furnishing such material or equipment. The Owner, with the assistance of the Architect and Construction Manager, will decide which Subcontractor(s) shall furnish the same.

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~~§ 1.5.1 The-Unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, 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 unless otherwise indicated in the Contract Documents or the Owner/Architect Agreement, the Architect and respective consultants will 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.~~

...

~~§ 1.6.1 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 national overnight courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement. Further, any other written notice delivered with a written acknowledgement or receipt shall be deemed duly served, regardless of method.~~

~~Wherever the Contract Documents require the Contractor to give "Notice" or "Timely Notice" to the Architect, Public Authority, and/or others, it shall be the Contractor's responsibility to furnish all such notices sufficiently in advance to allow the party receiving the notice reasonable time to react to such notice, including travel time on the job site as necessary, when such notices require the on-site presence of the Architect, Public Authority, their authorized representatives, or others for field observation of inspections, testing or approvals. Reasonable time shall be defined as no less than 24 hours plus normal travel time from the home office of the party being notified to the job site and must also accommodate known, standard, or reasonable processing periods.~~

...

~~The parties shall may agree upon written protocols governing the transmission and use of, and reliance on, of Instruments of Service or any other information or documentation in digital form. The parties may use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.~~

#### ~~§ 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.~~

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~~§ 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.~~ authorization subject to parameters of authority established by Owner's board of education. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do 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.

...

~~§ 2.2.4~~ Where the Owner has designated information furnished under this Section 2.2 as Owner's information is "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.

...

~~§ 2.3.1~~ Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, ~~including including, but not limited to,~~ 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. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

~~§ 2.3.2~~ The Owner shall retain an architect Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. is located, if licensed architecture is required by law for the Project. 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. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

~~§ 2.3.3~~ The Owner shall retain a construction manager adviser is lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

~~§ 2.3.4~~ If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect ~~to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.~~

~~§ 2.3.5~~ 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 Taking into account the Contractor's experience and expertise, and exercise of professional caution, 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. The Contractor shall not be entitled to additional compensation resulting from its failure to confirm the location of the site utilities or existing structures prior to bid opening.

~~§ 2.3.6~~ The Upon specific written request of the Contractor, 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. Contracts with other Contractors alone shall not constitute sufficient Owner control for purposes of this section.

~~§ 2.3.7~~ Unless otherwise provided in the Contract Documents, the ~~Owner shall furnish to the Contractor~~ Contractor will receive at least one copy of the Contract Documents in pdf format (or another format reasonably approved by the Owner) for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

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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. This right shall be in addition to and not in limitation of the Owner's rights under any provision of the Contract Documents.

...

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten-day~~ three-day period after receipt of notice from the Owner or the Owner's designee (or immediately in the case of a threat to the safety of persons or property) 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 review by the Construction Manager and prior approval of the Architect, and the Construction Manager or 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 including any claim against the Contractor's Performance Bond, correct such default or neglect. In such case, the Owner may deduct from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses, including any and all legal expenses incurred to effectuate and enforce this provision and compensation for the Construction Manager's and Architect's and their respective consultants' 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.

If the Architect, Construction Manager, Owner, or other contractors or consultants are required to provide additional services due to defects or deficiencies in the Contractor's work or by failure of the Contractor to perform under its agreement, the Contractor shall be responsible for all such costs and fees (including attorney fees), which shall promptly be paid to the Owner. The Owner, Contractor, Architect, and Construction Manager acknowledge that the Owner's receipt of such payment from the Contractor is a condition precedent to the Owner's obligation to make payment to those adversely affected.

This Section 2.5 allows the Owner to withhold payments from a non-performing Contractor irrespective of the termination procedure identified in Section 14.2, and the Owner may pursue either remedy, or both.

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§ 3.1.1.1 Possession, sale, or consumption of alcoholic beverages on the construction site is strictly prohibited. The unlawful manufacture, distribution, dispensation, possession or use of drugs is prohibited on the construction site.

...

§ 3.2.5 Prior to submitting its bid, the Contractor shall have studied and compared the Contract Documents and shall have reported to the Architect any error, inconsistency, or omission in the Contract Documents related to its work. It will be presumed that the Contractor's bid and the Contract Sum include the cost of correcting any error, inconsistency, or omission, which could have been discovered by the exercise of reasonable diligence. Unless the Contractor establishes that such error, inconsistency, or omission could not have been discovered by the exercise of reasonable diligence, the Contractor will make such corrections without additional compensation so that the Work is fully functional.

§ 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, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or ~~procedures~~-procedures, specifically including any delays that could impact timely coordination and completion of the Work. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. The Contractor shall immediately notify the Construction Manager of delays of other contractors that could impact timely coordination and completion of the Work.

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§ 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. Such provision of labor and materials shall occur in sufficient time to satisfy the existing Project schedule. The Contractor bears the risk of any failure to timely provide such labor and materials for any reason. The Contractor agrees to execute the appropriate UCC forms to effectuate the Owner's ownership of the material and equipment furnished pursuant to this Agreement.

...

§ 3.4.4 The Contractor, Construction Manager, and Architect each respectively agree that neither they nor their subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this contract, with respect to hire, tenure, conditions or privilege of employment, or any matter directly or indirectly related to employment, because of race, age, sex, color, religion, national origin, ancestry or physical disability. Breach of this covenant may be regarded as a material breach of this contract.

#### **§ 3.4.5 Asbestos-Free Product Installation**

§ 3.4.5.1 It is hereby understood and agreed that no product and/or material containing asbestos including chrysolite, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the Work by the contractor or his employees, agents, subcontractors, or other individuals or entities over whom the Contractor has control. If applicable, the Contractor shall be required to provide a signed certification statement ensuring that all products or materials installed or introduced into the work all be asbestos-free.

§ 3.4.5.2 The Contractor shall also be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the requirements of Section 3.4.5.1.

§ 3.4.5.3 The Contractor shall complete and submit to the Owner a certification evidencing asbestos-free product installation prior to issuance of the final Certificate for Payment, in a form acceptable to the Owner.

§ 3.5.1 ~~The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract~~ In addition to any other warranties, guarantees or obligations set forth in the Contract Documents or applicable as a matter of a law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

- .1 The Owner will have good title to the Work and all materials and equipment incorporated into the Work and, unless otherwise expressly provided in the Contract Documents, 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-~~new~~;

2. The Work and all materials and equipment incorporated into the Work will be free from all defects, including any defects in workmanship or materials;
3. The Work and all equipment incorporated into the Work will be fit for the purpose for which they are intended;
4. The Work and all materials and equipment incorporated into the Work will be merchantable; and
5. The Work and all materials and equipment incorporated into the Work will conform in all respects to the Contract Documents.

If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. 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 Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

Upon notice of the breach of any of the foregoing warranties or guarantees or any other warranties or guarantees under the Contract Documents, the Contractor, in addition to any other requirements in the Contract Documents, will commence to correct such breach within seventy-two (72) hours after written notice thereof and thereafter will use its best efforts to correct such breach to the satisfaction of the Owner; provided that if such notice is given after final payment hereunder, such seventy-two (72) hour period shall be extended to seven (7) days. The foregoing warranties and obligations of the Contractor shall survive the final payment and/or termination of the Contract.

The Contractor shall, at the time of final completion of the Work and as a condition precedent to final payment to the Contractor, assign to the Owner all manufacturers' warranties related to the materials and labor used in the Work. The Contractor further agrees to perform the Work in such manner as to preserve any and all such manufacturers' warranties and deliver to the Owner the warranties, project manuals, operating procedures, and other materials related to each of the building systems and materials included in the Contractor's Work and as required by the Specifications.

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The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof 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. The Contractor shall also pay all state and federal taxes levied on its business, income or property and shall make all contributions for social security and other wage or payroll taxes. The Contractor shall be solely responsible for such payments and shall hold the Owner harmless from same.

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**§ 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 written and dated notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Owner and the Architect, in consultation with the Construction Manager, 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, they will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Owner and the Architect, in consultation with the Construction Manager, 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, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may the Contractor shall submit a Claim as provided in Article 15. The requirements of Section 2 of 1998 PA 57 (MCL 125.1592), as amended, are hereby incorporated into this document. The Contractor shall be alert to any indication or evidence of existing underground or concealed utilities or structures not shown on the Contract Documents and shall immediately notify

the Owner of discovery of such evidence. If the Contractor encounters such utilities or structures, it shall cease operations immediately to minimize damage and shall notify the Owner and Architect. The Contractor shall bear the cost of damage resulting from its failure to exercise reasonable care in its construction activity or from continuing operations without notifying the Owner.

§ 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~~ provide written and dated notification to the Owner, Construction Manager, 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~~ shall be made, as needed as provided in Article 15.

...

- 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.

...

§ 3.9.1 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. The superintendent and any other personnel shall be satisfactory to the Owner in all respects, and the Owner shall have the right to require the Contractor to remove any superintendent or any other personnel from the Project whose performance is not satisfactory to the Owner and to replace such superintendent or other personnel with another who is satisfactory to the Owner.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. ~~Within The Owner and/or the Construction Manager may reply within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager 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, Construction Manager, 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.~~ consent.

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§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, 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. In no event shall the Contractor's Construction Schedule be extended due to action or inaction of the Contractor, except with prior written approval of the Owner within the Owner's sole discretion. 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. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 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 Owner's, Construction Manager's and Architect's

~~approval. The Architect and Construction Manager's approval which 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 Construction Manager and Architect reasonable time to review submittals, and (3) provide for expeditious and practical execution of the Work. 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.~~

...

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.10.5 The Contractor shall cooperate with the Construction Manager in scheduling and performing its Work to avoid conflict or interference with the Work of others, and the Contractor shall be responsible for any conflict or interferences that it causes. The Construction Manager and the Contractor acknowledge and understand that the work schedule will be modified from time-to-time with the Owner's approval to coordinate with the work of others and that such schedule changes do not give rise to a claim for damages or additional compensation by the Contractor for delay or otherwise. The Contractor shall be required to conform to the most recent Owner-approved schedule and acknowledges that fact was taken into account when it agreed to the Contract Sum and entered into this Contract.

§ 3.10.6 The Contractor shall cooperate with the Construction Manager in working out and following the proper sequence of operations between the Work of the Contractor and that of other trades on the site.

§ 3.10.7 The Contractor shall prosecute the Work undertaken in a prompt and diligent manner whenever the Work (or a part thereof) becomes available, or at such other time as the Owner and/or Construction Manager may direct so as to promote the general progress of the entire construction. The Contractor shall not, by delay or otherwise, interfere with or hinder the Work of the Construction Manager or any other Contractor. Any materials that are to be furnished by the Contractor shall be furnished in sufficient time to enable the Contractor to perform and complete its Work within the time or times provided in the schedule. If the Contractor shall, through its action or inactions, including the actions or inactions of its' subcontractors or suppliers, fall behind in furnishing necessary labor and/or materials to meet the construction needs in accordance with the established schedule, then it shall increase its forces or work such overtime as may be required, at its own expense, to bring its part of the work up to the proper schedule. In the event that the Contractor does not take such action necessary to bring its part of the work up to schedule, as determined by the Construction Manager, then the Owner may supplement the Contractor's forces or take other action permitted under Section 2.4 or Section 2.5. The Contractor shall be responsible for any and all costs of performing or completing the Work and shall pay any such sums within ten (10) days of an invoice. If not paid within ten (10) days, the amount will be withheld from the Contractor's next payment and paid to the relevant parties. If the amounts withheld from payments then or thereafter due Contractor are insufficient to cover such costs, the Owner may bill these costs to the Contractor, and the Contractor shall pay any such sums within ten (10) days of an invoice. Exercise of such rights shall in no way limit or jeopardize the Owner's right to any other remedy, including but not limited to a claim against the Performance Bond of the Contractor.

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§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor for submittal to and review by the Architect to illustrate materials or equipment for some portion of the Work. All Work shall be furnished and installed in accordance with the Drawings, Specifications and as additionally required by the manufacturer's printed instructions. The Contractor shall review the manufacturer's instructions, and where conflict occurs between the Drawings or Specifications and the manufacturer's instructions, the Contractor shall request clarification from the Architect prior to commencing the Work.

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§ 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 review and approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in a detailed writing 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.

...

§ 3.12.10.1 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 reasonably rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. ~~Documents subject to its experience and expertise.~~ 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, the Architect, and the Owner shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals. The Architect and Construction Manager shall be entitled to reasonably~~ 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, subject to their professional judgment, experience, and expertise.~~ 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. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect. Only materials and equipment which are to be used for the Project or to carry out the Work shall be stored at the Project site(s). Protection of such materials and equipment shall be the sole responsibility of the Contractor.

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§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Only materials and equipment which are to be used for the Project or to carry out the Work shall be stored at the Project site(s). Protection of such materials and equipment shall be the sole responsibility of the Contractor.

...

§ 3.15.1 The Contractor and its Subcontractors 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.

...

§ 3.15.3 Any areas and/or concurrently occupied space both occupied by the Owner and used in the progress of the Work, whether within the limits of the construction site or the adjacent areas leading to it, shall be maintained in a clean and safe condition and open to travel. Failure by the Contractor to maintain said areas will result in the Owner's cleaning of same, at the expense of the Contractor.

...

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 indemnify and hold harmless the Owner, Construction Manager, and Architect ~~harmless from~~ from any and all cost, damage, and loss on account thereof, including, but not limited to actual



attorneys' fees, 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, Architect, or Construction Manager. 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 through the Construction Manager. The review by the Owner of any method of construction, invention, appliance, process, article, device or materials of any kind shall be for its adequacy as integrated into the Work and shall not be an approval for the use thereof by the Contractor in violation of any patent or other rights of any third person.

...

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and 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 in any way related to performance of the Work, or the duties or obligations of this Agreement or the failure of the Contractor or the Work to conform with the Contract Documents, caused in whole or in part by any acts or omissions of the Contractor, a Subcontractor, or 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. ~~them or anyone for whose acts of any of them may be liable.~~ The Contractor shall not be obligated to indemnify a party for that party's sole negligence but shall remain liable to the fullest extent of its fault or the fault of a person for whom the Contractor is responsible (e.g., a Subcontractor). The Contractor shall be responsible to the Owner, Construction Manager, Architect, Architect's consultants and agents and employees of any of them from and against all amounts such parties may be required to pay in attorney fees in order to pursue enforcement of this provision against the Contractor or otherwise obtain indemnification from the Contractor provided under the terms of this Section 3.18 or any other applicable Contract Document. Such obligation shall not be construed to negate, abridge, ~~abridge~~ or reduce any other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18, which would otherwise exist as to any party or person set forth in this section. To the fullest extent permitted by law, the Contractor shall indemnify the Owner and save the Owner harmless against all loss by fines, penalties or corrective measures resulting from negligent or wrongful acts or omissions by the Contractor, its Subcontractors, agents, employees or assigns, with respect to the violation of safety requirements of this Contract, including reasonable attorney fees.

**§ 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. addition to and not in limitation of the Contractor's other indemnity obligations, the Contractor hereby accepts and assumes exclusive liability for and shall indemnify and save harmless the Owner, Construction Manager and Architect from and against the payment of the following:

All contributions, taxes, or premiums (including interest and penalties thereon) which may be payable under the unemployment insurance law of any state, the federal Social Security Act, federal, state, county and/or municipal tax withholding laws, or any other law, measured upon the payroll of or required to be withheld from employees by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

All sales, use, personal property and other taxes (including interest and penalties thereon) required by any federal, state, county, municipal or other law to be paid or collected by the Contractor or any of its Subcontractors or vendors or any other person or persons acting for, through or under it or any of them, by reason of the performance of the Work or the acquisition, ownership, furnishing, or use of any materials, equipment, supplies, labor, services or other items for or in connection with the Work;

All pension, welfare, vacation, annuity and other benefit contributions payable under or in connection with respect to all persons by whomsoever employed, engaged in the Work to be performed and furnished under the Contract Documents.

The Contractor shall indemnify and hold the Owner harmless from any claim, damage, loss or expense, including but not limited to actual attorney fees, incurred by the Owner related to any hazardous material or waste, toxic substance, pollution or contamination brought into the Project site or caused by the Contractor or used, handles, transported, stored, removed, remediated, disturbed or dispersed of by Contractor.

§ 3.18.3 In the event that any claim is made or asserted, or lawsuit filed for damages or injury arising out of or resulting from the performance of the Work, whether or not the Owner is named as a party, the Contractor shall immediately advise the Owner, in writing, of such claim or lawsuit and shall provide a full and complete copy of any documents or pleadings thereto, as well as a full and accurate report of the facts involved.

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§ 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. The term "Architect," "Architect/Engineer," "Engineer," or "Design Professional" as used herein means the Architect or the Architect's authorized representative.

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

...

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for ~~Payment.~~ Payment and with the Owner's written concurrence during the correction period. The Construction Manager and 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 more frequently, as otherwise agreed with the ~~Owner.~~ Owner or as required by law, 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.~~ Documents. Subject to the Owner/Architect Agreement, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, will guard the owner against defects and deficiencies in the work, and promptly report to the Owner and Construction Manager known deviations from the ~~Contract Documents.~~ Documents, the Project schedule and defects and deficiencies observed in the Work.

...

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project ~~schedule.~~ schedule and shall supervise construction as required by 1937 PA 306 (MCL 388.851 et seq.).

§ 4.2.5 The Construction ~~Manager, Manager and Architect,~~ except to the extent required by Section 4.2.4, and Architect 4.2.4 or by 1937 PA 306 and/or 1980 PA 299, as applicable, will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the Contractor's safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the ~~Contract Documents, and Documents.~~ Documents. Except as required by their respective agreements with the Owner, neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the ~~Contract Documents.~~ Documents. Neither the Construction Manager nor the Architect ~~Documents and~~ neither will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work. The Construction Manager will schedule and coordinate the work of all Contractors on the Project, including the Contractors' use of the site. The Construction Manager will keep the

Contractors informed of the Project Construction Schedule to enable the Contractors to plan and perform the Work in a timely manner.

§ 4.2.6 **Communications.** The Owner shall endeavor to communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall endeavor to include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall endeavor to promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants ~~shall~~may be through the Architect. Communications by and with Subcontractors and suppliers ~~shall~~may be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

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§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and 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 Construction Manager and 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. However, should the Construction Manager or Architect discover during the course of such review any inaccuracies, incompleteness, or other irregularities, they shall immediately notify the Owner of the same to determine an appropriate corrective course of action or notify the Contractor of the same to correct the irregularities.

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§ 4.2.15 ~~Utilizing the documents provided by the Contractor, the~~The Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner in good condition and reasonably organized upon completion of the Project.

...

§ 4.2.17 ~~If the Owner and Architect agree, the~~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 Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.19 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,~~interpretations, 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~~ so rendered in good ~~faith~~faith and without negligence.

§ 4.2.20 The Architect's ~~decisions~~interpretations on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract ~~Documents.~~Documents and acceptable to the Owner.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract

Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable ~~promptness~~, promptness given the particular circumstances. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

...

§ 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 other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors. The term "Subcontractor" shall also include material and equipment suppliers.

...

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish supplies, materials or equipment, ~~equipment~~, including those fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager ~~may~~ will notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. ~~Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.~~ The Contractor shall remain, in all instances, jointly and severally liable to the Owner for all acts or omissions of its Subcontractor. All contractual agreements with additional persons or entities serving as a subcontractor shall incorporate the Contract Documents, expressly identify the Owner as a third-party beneficiary, give the Owner all rights against the Subcontractor that it would have against the Contractor and state that the Owner shall enjoy all third-party beneficiary rights not prohibited by law.

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§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution. The Contractor shall notify the Owner, the Architect, and the Construction Manager of any proposed subcontractor substitution a minimum of 10 days prior to such proposed change.

...

§ 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.~~ may be equitably adjusted as negotiated by the parties.

§ 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.~~

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§ 6.1.1 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~~ insurance. The Construction Manager and Contractor shall be responsible for coordinating the Work with the work of other Contractors, including the Owner's own forces or Separate Contractors so as to complete the Work in accordance with the Project schedule.

...

~~§ 6.1.3 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.

...

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, 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 delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.~~

§ 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, Construction Manager, Separate Contractors, or other Contractors as provided in Section 10.2.5. Should a claim be made that the Contractor wrongfully delayed or caused damage to the Work or property of another contractor (including the Owner's own forces, other Contractors, or Separate Contractors), the Contractor shall promptly settle the dispute with such other contractor. If such other contractor sues the Owner on account of any delay or damage alleged to have been caused by the Contractor, the Construction Manager will notify the Contractor who shall defend such proceedings at the Contractor's sole expense. If any judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all costs, including attorneys' fees and court costs, which the Owner may have incurred.

...

If a dispute arises among the Contractor, Separate Contractors, other 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 Construction Manager, with notice to the Architect,~~ will allocate the cost among those responsible. The Owner's right to clean up shall in no event be deemed a duty, and should the Owner choose not to pursue this remedy, the Contractor necessitating such action shall remain fully responsible for the same.

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

...

§ 7.2.3 The Contractor's agreement on any Change Order shall constitute its final settlement of all matters relating to the direct and indirect costs associated with such change and any and all related adjustments to the Contract Sum and the Contract Time.

...

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

...

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall ~~determine-determine,~~ with the Owner's approval, 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 Construction Manager 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 a reasonable amount of the following:

**PAGE 23**

§ 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 Construction Manager 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. Contractor agreements to a Construction Change Directive shall require a follow-up writing or signature as contemplated in Section 7.3.7.

...

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for undisputed Work completed under the Construction Change Directive in Applications for Payment. ~~The~~ For those undisputed portions, the Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of ~~cost~~ cost, if agreed to by the Owner in writing, 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 in writing with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the ~~adjustments,~~ adjustments in writing, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

...

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 Owner and Construction Manager 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 Owner and Construction Manager 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.

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§ 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 obtaining all supplies, materials, tools and equipment necessary to perform the Work and for properly performing the Work.

...

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. All work shall be completed in sufficient time to allow for clean-up and preparation for Owner move-in prior to the date of Substantial Completion.

...

§ 8.3.1 ~~If~~ Provided the Contractor submits a written request for an extension not more than fourteen days after the occurrence that gives rise to the delay, 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, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by ~~labor disputes, fire, unusual delay in deliveries, fire, government-declared emergencies,~~ labor disputes, fire, unusual delay in deliveries, fire, government-declared emergencies, 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, litigation, mediation, or arbitration, as applicable;~~ mediation and binding dispute resolution, litigation, mediation, or arbitration, as applicable; or (5) by other causes that the Contractor asserts and the Architect, based on the

~~recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine. may be extended by Change Order. Failure of the Contractor to submit a timely request for an extension shall irrevocably waive the Contractor's right to such an extension of time. If the contract time is subject to extension pursuant to this subparagraph, such extension shall be the exclusive remedy of the Contractor and the Contractor shall not be entitled to recover damages from the Owner. Further, minor modifications in Contract time resulting from adjustments in the Project construction schedule shall not be deemed a sufficient cause for an extension of time under this Section.~~

...

~~§ 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.~~

#### **§ 8.4 Delay Damage Claims**

**§ 8.4.1** If the Contractor fails to complete its Work on time resulting in loss or damage to the Owner, the Owner shall be entitled to recover any damages caused by the Contractor's breach, including overhead, profit, extended general conditions, actual attorney fees, etc.

**§ 8.4.2** In the event the Contractor is delayed or hindered in the commencement or progress of the Work, including but not limited to those delays caused by the Work or lack of Work of another contractor or subcontractor on the Project, and the Contractor claims monetary damages as a direct and proximate consequences thereof (including, but not limited to, extended general conditions, overhead, profit, overtime, interest, supervisions or other costs or profits whatsoever), then the Contractor shall not assert such claims against the Architect, Construction Manager or Owner and, as to the Architect, Construction Manager and Owner, the Contractor's claims of such delay damages are hereby waived. The Contractor's sole and exclusive remedy regarding claims for monetary delay damages shall be to pursue such claims directly against any contractor(s) and/or subcontractors on the job which may have caused the delay, and with regard to such claims asserted against the Contractor by any other contractor(s) and/or subcontractors, the Contractor hereby waives the defense of absence of contractual privity and hereby assumes liability to other contractor(s) and/or subcontractors arising out of the Contractor's actions or inactions resulting in such delay and claim.

**§ 8.4.3** For any delay claims raised against the Owner, the Contractor's sole and exclusive remedy is an extension of time to perform the Work not to exceed the time frame of any proven delay. Under no circumstances is the Contractor entitled to monetary delay damages from the Owner.

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**§ 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~~ adjusted, unless the Contractor provided such unit prices as a part of a competitive bid.

...

~~Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, Before the first Application for Payment, the Contractor shall submit a schedule of values to the Construction Manager, 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 Construction Manager and the Architect. This schedule, unless objected to by the Owner, Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Owner and Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.~~

...

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, ~~if required under Section 9.2, values~~ 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, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien 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 Construction Manager and Architect, but not yet included in Change Orders. A Contractor's request for payment of sums related to work regarding Construction Change Directive shall, unless qualified in writing at the time of request, constitute full and complete consent to the Construction Change Directive(s) and to the issuance of a Change Order.

...

§ 9.3.1.3 The Contractor shall submit with each monthly Application for Payment (1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous application was submitted and the Owner might in any way be responsible have been paid or otherwise satisfied, and (2) a release or waiver of liens rising out of the Contract from each Contractor and/or Subcontractor, materialman, supplier and laborer or the Contractor addressing all previous Applications for Payment submitted for the Project.

§ 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. Payment to Contractor for materials stored off site is discouraged. When circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Owner and Construction Manager for approval to include such material costs in its next progress payment. The Contractor's request shall include the following information:

- .1 A list of the fabricated materials consigned to the Project (which shall be clearly identified, giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.
- .2 Certification that items have been tagged for delivery to the Project and that they will not be used for another purpose.
- .3 A letter from the Contractor's Surety indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party of their responsibility to complete the Work.
- .4 Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.
- .5 Costs incurred by the Owner, Construction Manager and Architect to inspect material in off-site storage shall be paid by the Contractor.
- .6 Subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in off-site storage.
- .7 When a partial payment is allowed on account of material delivered on the site of the Work or in the vicinity thereof or under possession and control of the Contractor, but not yet incorporated therein, such material shall become the property of the Owner, but if such material is stolen, destroyed or damaged by casualty before being used, the Contractor will be required to replace it at its own expense.

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§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The



Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors. As between the Owner and the Contractor, the failure of the Architect or Construction Manager to notify the Contractor or the Owner of a withheld certification does not render such withholding ineffective, and the Owner shall have no obligation to pay a Contractor for uncertified amounts or amounts for which no Certificate for Payment has been issued. If the Contractor does not receive notice of a withheld certification, it shall proceed as provided in Section 9.7.

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§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 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 Construction Manager or ~~Architect~~. Architect, in writing, together with the Certification which the qualification pertains.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect ~~has~~ has, unless otherwise required by contract or law, (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.

...

.1 ~~defective Work not remedied;~~ remedied, or the Contractor is in breach of the Agreement;

...

.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.

.8 the Work not having progressed to the extent set forth in the Application for payment; or

.9 representations of the Contractor are untrue.

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§ 9.5.5 If the Contractor disputes any determination by the Owner, Architect, or Construction Manager with regard to any Certificate for Payment, the Contractor shall nevertheless continue to expeditiously perform the Work and such dispute shall provide no basis for any manner of suspension of the Contractor's performance of the Work.

...

§ 9.6.1.1 The Owner may, in its sole discretion, choose to make payments to Contractors through the Construction Manager. More particularly, the Owner may distribute funds to the Construction Manager for the Construction Manager to then provide payment to each respective and applicable Contractor. The Owner may discontinue this practice at any time in its sole discretion.

...

§ 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. Owner may, in its sole discretion, after providing Contractor with ten (10) days prior written notice, make direct payments to the Contractor's Subcontractors, material men, laborers or claimants relating to labor or material provided to the Contractor in the event the Subcontractors, material men, laborers or claimants threaten to or actually cease providing labor and/or materials for the Project due to nonpayment such that, in the Owner's determination, progress of the Project and the Project's schedule are jeopardized. All payments made pursuant to this section shall be considered the same as if paid directly to the Contractor and shall constitute partial payment of the Contract Sum. In the event the Contractor disagrees with the amount proposed to be paid to one or more

Subcontractors, material men, laborers or claimants, the Contractor shall provide a bond in the amount the Contractor believes the Owner will overpay, within ten (10) days of receipt of notice, or be barred from making any claim that the amount of the direct payment was incorrect. Payment under this provision shall not jeopardize any other remedy available to the Owner.

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§ 9.6.9 Subject to applicable law, if a petition in bankruptcy or any other arrangement or proceeding regarding insolvency, assignment for the benefit of creditors, trust, chattel mortgage, or similar state or federal proceeding, whether voluntary or involuntary, shall be filed with respect to the Contractor, the Owner may withhold the final balance, or any other payments, whether or not an application for progress payment has been properly filed, until expiration of the period of any guarantees or warranties required for the Contractor, and the Owner may pay out such funds the amount necessary to satisfy any claims or costs that otherwise would have been covered by such guarantees or warranties.

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, Contractor and without justifiable basis under the Contract Documents, within fourteen days after the Construction Manager's 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 Construction Manager and Architect or awarded by binding dispute resolution, ~~then the Contractor may, upon seven~~ unless the Owner, in good faith, disputes the amount certified, then the Contractor may, upon twenty-one additional days' notice to the Owner, Construction Manager and Architect, stop the Work until ~~payment of the amount owing has been received.~~ (1) the Contractor receives payment of the amount owing, or (2) the Contractor receives notice from the Architect, Construction Manager, or Owner of a full or partial withheld certification as provided herein. 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. The Owner shall have no obligation to pay the Contractor unless it receives a Certificate for Payment for the amount certified. The Owner may withhold payment from a non-performing Contractor irrespective of the issuance of a Certificate for Payment.

...

§ 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 and when all required occupancy permits, if any, have been issued, so the Owner can occupy or utilize the Work for its intended use.

...

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, 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 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, immediately. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

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§ 9.8.6 Notwithstanding Sections 9.8.1 and 9.8.2, as a condition precedent to establishing the date of Substantial Completion, the Contractor shall prepare and submit to the Architect and Construction Manager a comprehensive list of items to be completed or corrected (a "punch list"). The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Should the Contractor fail to make corrections in a timely fashion, but not later than thirty (30) calendar days from the date of Substantial Completion or notification of the required corrections, whichever is earlier, such Work may be corrected by the Owner at the Contractor's sole expense, and the Contract Sum may be adjusted accordingly.

§ 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 and Construction Manager shall jointly 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 after consultation with the Construction Manager. The Contractor shall proceed with the work in such a manner as reasonably directed and shall cooperate with the Owner to limit interruptions.

...

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (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) payment~~, (5) an affidavit that states the Work is fully completed and performed in accordance with the Contract Documents and is satisfactory to the Architect and the Owner, (6) in the event of Contractor bankruptcy, at the Owner's option, an order entered by the court having jurisdiction of the Contractor's insolvency proceeding authorizing such payment, (7) a general release executed by the Contractor on a form provided by the Construction Manager, (8) all close-out documents and warranties have been provided in a reasonable and acceptable manner, (9) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and ~~(6), (10)~~, 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-actual~~ attorneys' fees.

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§ 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. not constitute a waiver of any Claims by the Owner.

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

§ 9.10.6 All architectural costs incurred after the specified Final Completion date resulting from the Contractor's failure to complete the Work as agreed shall be paid by the Contractor to the Owner prior to the authorization of final payment. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the current rate schedule in effect at the time of service, for services provided in connection with the Work. The architectural costs incurred after the final completion date will be deducted from the Contractor's progress payment or final payment as applicable.

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§ 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. The Contractor shall take all reasonable safety precautions with respect to its

Work and the work of others, shall comply with all standard industry safety measures and shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority and all other requirements of the Contract Documents, including those applicable to the safety of persons or property. The Contractor shall be responsible for the safety of all of the Contractor's employees and the safety of all of the Contractor's Subcontractors, suppliers, and their employees. The Contractor shall report in writing to the Construction Manager any injury to any of Contractor's or its Subcontractors' employees at the site within one (1) day after the occurrence of such injury. The Contractor acknowledges receiving, or having access to an opportunity to review, health and safety information about the Project site(s), including any applicable asbestos management plan and any other environmental information it deems necessary to perform the work.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, ~~reasonable~~ reasonable, necessary, and appropriate 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. The Contractor shall be solely and fully responsible for any and all damage claims and for defense of all actions against the Owner relating to such explosives, hazardous materials and/or unusual methods.

§ 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, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4. 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, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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.

...

If either party the Contractor suffers injury or damage to person or property because of an act or omission of the other party, the Owner, or of others for whose acts such party the Owner is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party Owner 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. Owner to investigate the matter. The Contractor's failure to do so shall be an irrevocable waiver of any claim against the Owner arising out of such injury or damage. Injury or damage to persons or property suffered by the Owner because of an act or omission of the Contractor or others for whose acts the Contractor is legally responsible shall be subject to the limitations provisions established by Michigan law.

§ 10.2.8.1 The Contractor causing damage to the Work of another Contractor shall be responsible for the repair and replacement of such damaged Work. Back charges may be made against the Contract sum of the damaging Contractor when corrections are not made promptly.

§ 10.2.8.2 The Owner reserves the right to pay the Contractor suffering damage from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the Contract amount due the said responsible Contractor.

§ 10.2.9 If the Contractor or any Subcontractor chooses to use any systems, equipment, facilities, or services which have been incorporated in the Project as a permanent part thereof by any other, the Contractor shall assume full responsibility for damages caused to said systems, equipment, facilities or services, and have damages repaired as required, so that in no case will the performance of the used systems, equipment, facilities or services be diminished from the specified criteria as a result of such use.

§ 10.2.10 The Contractor acknowledges that the safety of the Owner's students, employees and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees and guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities. Without limiting the foregoing provisions, the Contractor shall comply with all laws applicable to students and/or school safety.

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~~§ 10.3.2~~ Upon receipt of the Contractor's notice, the Owner in its discretion 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~~ shall, as a courtesy, furnish in writing to the Contractor, Construction Manager 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, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager 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 to address 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, Construction Manager, Architect, their 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 site.~~ To the extent the Contract requires the removal, transport and disposal of hazardous materials, the Contractor agrees that it assumes responsibility for said tasks as a part of the Agreement.

...

~~§ 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.

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's reasonable 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. Nothing in this section will be construed as relieving Contractor from the cost and responsibilities for emergencies covered hereby.

#### § 10.5 Notification of Utility Companies

§ 10.5.1 At least five (5) working days prior to the start of work in areas which may involve existing utility lines, the Contractor shall notify the MISS DIG notification system of the planned work.

§ 10.5.2 The utility company should, upon receipt of notice, stake, mark or otherwise designate the location (and depth) of their lines, or temporarily move the line(s).

§ 10.5.3 The Contractor shall immediately report to the respective utility company any break or leak in its lines, or any dent, gouge, groove or other damage to the utility line or to its coating or cathodic protection made or discovered in the course of the Work.

§ 10.5.4 The Contractor shall immediately alert the Owner, Construction Manager, Architect and occupants of nearby premises of any and all emergencies caused or discovered in the utility lines(s) in the course of the Work.

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§ 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. Agreement, as described elsewhere in the Contract Documents, as required by law, or as reasonably required by the Owner in light of the nature of services performed and insurance obligations of its other contractors and consultants. 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, Construction Manager and Construction Manager's consultants, and the 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. On all insurance contracts under which the Contractor is obligated to have its insurance company name the Owner as additional insured, the Contractor shall require such insurance company to add to the policy the following clause: "The insurance afforded to the Additional Insured is primary insurance. If the Additional Insureds have other insurance which is applicable to the loss on an excess or contingent basis, the amount of the insurance company's liability under this policy shall not be reduced by the existence of such other insurance." Certificates of insurance acceptable to the Owner shall be submitted by Contractor to the Owner and Construction Manager prior to commencement of Work and thereafter upon renewal or replacement of each required policy of insurance.

§ 11.1.2 The Contractor shall provide bonds covering faithful performance of 100% of the Contract and payment of 100% of the obligations arising thereunder as stipulated in bidding requirements or specifically required by the Contract Documents or by law on the date of the Contract. The Contractor shall provide such additional 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, located and that are reasonably acceptable to the Owner. The Construction Manager shall obtain copies of the Performance Bond and Payment Bond required by the Agreement from the Contractor prior to Contractor beginning performance pursuant to the Agreement. The Contractor's obligation to provide such bonds shall not be waived in any fashion, including any failure to secure such bonds prior to Contractor beginning performance pursuant to the Agreement.

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§ 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 both the Contractor and the Construction Manager, separately and 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.

§ 11.2.2.1 The Contractor shall at the Contractor's own expense provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work.

§ 11.2.2.2 The insurance required by Section 11.2 is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work, but not incorporated into permanent

improvements. The Contractor shall, at the Contractor's own expense, provide insurance for owned or rented machinery, tools or equipment.

**§ 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 directly to the Contractor, and separately to the Construction Manager, 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; and (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. may be adjusted negotiation between the parties. 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.

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**§ 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 Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) 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 Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, 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 is not waiving any rights its insurer(s) may have to subrogation. To the extent any terms in the General Conditions or any other Contract Documents are contrary to the aforementioned, such terms shall be deemed void and unenforceable.~~

**§ 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.~~

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, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.~~

...

**§ 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 Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and~~



~~Subcontractors in similar manner insureds.~~ The Owner shall use its best efforts, with consultation of the Construction Manager, to reach a quick and fair settlement for all interested parties, with the insurance companies after a loss.

~~§ 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.~~

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

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may ~~request~~request, with the Owner's consent, 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~~Owner shall reasonably adjust the Contract Sum and Contract Time as ~~may be appropriate.~~appropriate. At the time, Owner's consent is sought as described herein, the Architect and/or Construction Manager shall notify the Owner that additional costs may apply if the Work is in accordance with the Contract Documents. 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.

...

The Contractor shall promptly correct Work rejected by the Construction Manager or 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 Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If any portion of the Work is determined by the Owner, Construction Manager or Architect, either during performance of the Work or during any applicable warranty period, to be defective or not in compliance with the contract requirements, the Construction Manager or Owner shall notify the Contractor in writing that such Work is rejected. Thereupon, the Contractor shall immediately replace and/or correct such Work by making the same comply strictly with all the requirements therefor. The Contractor shall bear all costs of correcting such rejected Work, including work of other Subcontractors and including compensation for the Architect's and Construction Manager's additional services and any delay or related damage to the Owner made necessary thereby. The Construction Manager shall have the right to charge the Contractor for any compensation payable for the Architect's or Construction Manager's additional services required by the Contractor's rejected Work and deduct the payment from the next payment due the Contractor.

...

§ 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 or Construction Manager to do so, unless the Owner has previously



given the Contractor a written acceptance of such condition. The Owner or Construction Manager 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, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.~~

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§ 12.2.6 The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Failure to correct Work deficiencies and/or punch list items in a timely fashion shall be a substantial breach, and the Owner may terminate the Contract immediately without following the procedure identified in Section 14.2. As used in this Section 12.2.6, "timely" means the Contractor shall begin correction within three days of receiving the punch list or notice of work deficiency, and correction will be completed in a commercially reasonable time in accordance with the direction of the Construction Manager. Whether or not the Contract is terminated, if the Contractor fails to make corrections in a timely fashion, such Work may be corrected by the Owner, in its sole discretion, at the Contractor's expense and the Contract Sum may be adjusted by backcharge accordingly. The Contractor shall promptly notify the Construction Manager, in writing, when the Work deficiencies and/or punch list items are completed. Upon the review of the Work by the Construction Manager after such notification by the Contractor, if Work deficiencies and/or punch list items shall continue to exist, the Contractor shall reimburse any cost incurred by the Owner, including the Construction Manager's and Architect's fees for reinspections of the Work. Failure to pay such costs within ten (10) days of receipt of a demand regarding the same shall permit the Owner to withhold such amounts from the unpaid portion of the Contractor's contract.

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. The acceptance of nonconforming Work by the Owner shall be by written Change Order, specifically referencing that it addresses nonconforming work, acceptable to the Owner's authorized representative, and signed by all parties. Acceptance of nonconforming Work may only occur pursuant to such written Change Order.

...

~~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.State of Michigan in all respects, except that claims and causes of action brought by the Owner shall not be deemed untimely if filed within six (6) years of substantial completion of the entire (and all) Project(s).~~

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

...

§ 13.6 The Contractor agrees that time is of the essence and to start work when directed by the Construction Manager and to furnish sufficient materials and a sufficient number of properly skilled workers, so as not to delay the work of any other Contractor or completion of the Project.

§ 13.7 Notwithstanding any provisions within the Contract Documents, nothing shall be deemed a waiver of any immunity granted to Owner by law or statute, including but not necessarily limited to, governmental immunity under MCL 691.1407.

§ 13.8 The Owner, being a governmental unit, is protected by the Michigan Void Construction Contracts Act, MCL 691.991.

...

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days for reasons within the Owner's control 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 which may include any~~ of the following reasons:

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- ~~.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;~~
- ~~.3 Because the Construction Manager has not certified or 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, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents, subject to justifiable withholding of payment as described herein or in the Contract Documents; or~~

...

§ 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, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and ~~profit~~ direct costs 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~~ days, for reasons within the Owner's controls and through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons 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, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3. The Contractor may not terminate the Contract unless it has submitted claims for the delays and sought an extension of time for each delay.

...

- ~~.1 repeatedly~~ refuses or fails to supply enough properly skilled workers or proper ~~materials;~~ materials to the point of negatively impacting the Project and/or the related schedule;

...

- ~~.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.~~ Documents; or
- ~~.5 fails to prosecute the Work or any part thereof with promptness and diligence or fails to perform any provisions of this Contract, or goes into bankruptcy, liquidation, makes an assignment for the benefit of creditors, enters into a composition with its creditors, or becomes insolvent.~~

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, 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;~~ three days' notice, terminate the Contractor's right to proceed with the Work, or such part of the Work as to which such defaults have occurred, and may take any one or more of the following actions:

...

- ~~.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.

The notice required by this Section 14.2.2 shall not give the Contractor a right to cure defective Work or to cure other grounds for termination under Section 14.2.1. Further, the Owner's failure to strictly comply with the formal requirements of termination (e.g., by providing less than three days' notice of termination) shall not be a substantial breach by the Owner. The Owner may terminate the Contractor immediately if the Contractor endangers persons or property or has breached Project safety requirements).

In the event, the Contractor's surety bond requires notice of intent to declare a default of the Contractor and if such bond notice is provided by the Owner, such notice shall be adequate to satisfy the three (3) day written notice described above in this section.

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§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner in pursuing termination and completion of the Work, including actual attorney and legal fees and costs, 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, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

...

§ 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.~~termination.

...

§ 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.~~Contract, including but not limited to additional sums, additional time for performance, or damages for delay. 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. The Contractor shall not knowingly (as "knowingly" is defined in the Federal False Claims Act, 31 USC 3729, et seq.) present or cause to be presented a false or fraudulent Claim. As a condition precedent to making a Claim by the Contractor, the Claim shall be accompanied by an affidavit sworn to before a notary public or other person authorized to administer oaths in the State of Michigan and executed by an authorized representative of the Contractor, which states that: "The Claim which is submitted herewith complies with subparagraph 15.1.1 of the General Conditions, as amended, which provides that the Contractor shall not knowingly present or cause to be presented a false or fraudulent claim." Claims of the Owner shall be governed by the relevant Michigan statutory limitations period.

§ 15.1.2.1 Regardless of any provisions to the contrary, the statute of limitations with respect to any defective or nonconforming Work which is not discovered by the Owner shall not commence until the discovery of such defective or nonconforming Work by the Owner. See also Section 13.1.

~~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, accordance with Section 13.1 and Section 15.1.21.1, regardless of any other time frames identified in this Agreement. The Contractor shall commence all claims and causes of action in accordance with Section 15.1 and, if shorter, any other provisions of this Agreement and Michigan law.~~

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§ 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 written~~

notice to the ~~other party~~ Owner and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by ~~either party~~ the Contractor 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~~ Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.

§ 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 written notice to the other party. In such event, no decision by the Initial Decision Maker is required. Claims by the Contractor under this Section 15.1.3.2 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. Failure to timely and properly initiate a claim shall be an irrevocable waiver of such claim. Claims by the Owner shall be governed by the applicable statute of limitations period, except as such time frame may be longer in accordance with Section 13.1 and Section 15.1.2.1.

...

§ 15.1.4.1 Pending final resolution of a Claim, including by mediation and/or litigation, as applicable, 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 undisputed 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.~~ may be adjusted as mutually agreed by the Owner and Contractor. 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. Failure to provide such notice shall serve as an absolute bar against a claim for such an increase in the Contract Sum. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. A Project delay shall not be a basis for a Claim for additional cost. Delay claims against the Owner may be remedied only through an extension of time per Section 8.4.2 and Section 8.4.3.

...

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

...

§ 15.1.7 **Waiver of Claims for Consequential Damages.** The Contractor and Owner ~~waive Claims against each other~~ waives Claims against the Owner 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~~ the Owner's termination of the Contractor in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be

deemed to preclude assessment of liquidated ~~damages~~, damages in favor of the Owner, when applicable, in accordance with the requirements of the Contract Documents.

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§ 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-interpretation~~. The Architect will serve as the Initial Decision Maker, ~~unless otherwise indicated in the Agreement-Maker~~. Except for those Claims excluded by this Section 15.2.1, an initial ~~decision-interpretation~~ shall be required as a condition precedent to mediation ~~of any Claim~~. ~~If an initial decision or litigation of any Claim bought by the Contractor against the Owner~~. ~~If an initial interpretation 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-an interpretation having been rendered~~. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not ~~decide-interpret~~ 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-interpret the Claim~~. Within ten (10) days of a written request, the Contractor shall make available to the Owner or its representative all of its books, records, or other documents in its possession or to which it has access relating to a Claim and shall require its subcontractors, regardless of tier, and materialmen to do the same.

...

§ 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 will, based on its interpretation~~, either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial ~~decision-interpretation~~ approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial ~~decision-interpretation~~ shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, 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-interpretation shall be subject to the parties' agreed upon binding dispute resolution process.~~

§ 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. Regardless of any other time frames identified herein, claims and causes of action brought by the Owner shall be governed in accordance with the statute of limitations periods under Michigan law, except for such longer periods of time as may be permitted in Section 13.1 and Section 15.1.2.1.~~

~~§ 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 of 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. **SURETY**

**NOTICE AND PRIOR APPROVAL**

Except where otherwise expressly required by the terms of the Agreement, the Contract Documents or the General Conditions, exercise by the Owner of any contractual or legal right or remedy without prior notice to or approval by the Contractor's surety shall in no way bar or prohibit the Owner's ability to pursue such right or remedy. Further, pursuit of such a right or remedy without prior notice to or approval of surety shall in no way compromise, limit or bar any claim by the Owner against a surety bond of the Contractor. The Owner's claims against a Contractor's surety bond shall be governed by Section 13.1 with respect to any limitations periods.

~~§ 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.~~

~~§ 15.3.1 Claims, Except as otherwise agreed in writing by the parties, 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 commencement of the parties' agreed upon 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.~~

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#### ~~§ 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.~~

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

~~§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party.~~ The Owner, at its sole discretion, 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, mediation, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration-mediation 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.~~ Contractor further agrees to include similar dispute resolution provisions in all agreements with the independent contractors and consultants retained for the Project and to require all independent contractors and consultants also to include similar dispute resolution provisions in all agreements with subcontractors, all subconsultants, suppliers or fabricators so retained, thereby providing for a consistent method of dispute resolution between the parties to those agreements. Subject to the other limitations periods identified in these General Conditions which are understood to govern over this sentence, no demand for mediation shall be made after the date when the applicable statutes of limitations would bar legal or equitable proceedings. During the pendency of any mediation, all applicable limitations periods shall be tolled until the conclusion of that process.

The Owner reserves the right in its discretion to require consolidation or joinder of any mediation arising out of or relating to this Agreement with another mediation involving a person or entity not a party to this Agreement in any event the Owner believes such consolidation or joinder is necessary in order to resolve a dispute or avoid duplication of time, expense or effort. In the event the Owner is involved in a dispute which is not subject to mediation involving a person or entity not a party to this Agreement, the mediation provisions applicable to the parties shall be deemed to be void and nonexistent in the event Owner, in its discretion, determines the Contractor should become a party to that dispute by joinder or otherwise. Any mediation hearing shall be held in the general location where the Project is located unless another location is mutually agreed upon.

**§ 15.4.5 Prevailing Wage.** This project is not subject to the prevailing wage rates and fringe benefit requirements of the Michigan Prevailing Wage Act, MCL 401.1101, et seq.

## ***Certification of Document's Authenticity***

***AIA® Document D401™ – 2003***

I, \_\_\_\_\_, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:45:37 ET on 07/03/2024 under Order No. 3104239822 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

\_\_\_\_\_  
*(Signed)*

\_\_\_\_\_  
*(Title)*

\_\_\_\_\_  
*(Dated)*



**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Addenda are written or graphic instruments issued prior to execution of construction contracts which add to, delete from, clarify, or correct the Bidding Documents and/or the Contract Documents.
- B. Addenda may be included in the Bidding Documents and may be included in the Contract Documents.
- C. Addenda may be issued by either the Architect or the Construction Manager as deemed necessary to facilitate the building and construction of the Project.

**1.01 BIDDERS' AND CONTRACTORS' RESPONSIBILITIES**

- A. Each Bidder shall be responsible for taking the provisions of all Addenda issued prior to the Bid Date into account during the presentation of his Proposal.
- B. Each Bidder shall be responsible for obtaining all Addenda, and for ascertaining that all Addenda issued prior to the Bid Date have been considered in preparing his Proposal.
- C. Each Contractor shall perform his work in accordance with all Addendums issued.

**END OF SECTION 00900**

# **MILESTONE SCHEDULE ON FOLLOWING PAGE(S)**

**Milestone will be issued via addendum.**

END OF SECTION 00999

Oscoda Area Schools Bid Package 1  
HVAC Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	2024						
							T	W	T	F	S	S	
1		<b>Pre Construction Period</b>	<b>114 days</b>	<b>Wed 9/25/24</b>	<b>Sat 3/1/25</b>								
2		Bid Period	22 days	Wed 9/25/24	Thu 10/24/24								
3		Pre-Bid Meeting	1 day	Tue 10/8/24	Tue 10/8/24								
4		Bids Due - Bid Opening	1 day	Thu 10/24/24	Thu 10/24/24								
5		Post Bid Interviews	2 days	Mon 10/28/24	Tue 10/29/24								
6		Award Recommendations	1 day	Thu 10/31/24	Thu 10/31/24								
7		Owner Approval of Contracts	1 day	Mon 11/11/24	Mon 11/11/24								
8		Notify Contractors -Submittals/Order Materials	30 days	Thu 11/14/24	Wed 12/25/24								
9		Pre-Construction Meeting (Tenta	1 day	Wed 1/15/25	Wed 1/15/25								
10		<b>Unit E / Work area 1</b>	<b>43 days</b>	<b>Tue 6/10/25</b>	<b>Thu 8/7/25</b>								
11		Abatement WA 1	10 days	Tue 6/10/25	Mon 6/23/25								
12		Temporary Lighting	1 day	Tue 6/24/25	Tue 6/24/25	11							
13		CMU Top of wall demo for ductwork	1 day	Tue 6/24/25	Tue 6/24/25	11							
14		Basement Mechanical / Electrical	35 days	Tue 6/24/25	Mon 8/11/25	11							
15		Above Ceiling duct and duct insulation	15 days	Tue 6/24/25	Mon 7/14/25	11							
16		Suspended ceilings	5 days	Thu 7/10/25	Wed 7/16/25	15FS-3 days							

Oscoda Area Schools Bid Package 1  
HVAC Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	24						
							T	W	T	F	S	S	
17		Lighting and Diffusers	4 days	Wed 7/16/25	Mon 7/21/25	16FS-1 day							
18		Suspended ceiling tiles	3 days	Mon 7/21/25	Wed 7/23/25	17FS-1 day							
19		Polished Concrete Floors	8 days	Tue 7/22/25	Thu 7/31/25	18FS-2 days							
20		Rooftop mechanical and electrical work	25 days	Tue 6/10/25	Mon 7/14/25								
21		AE Punch Lists	1 day	Fri 8/1/25	Fri 8/1/25	19							
22		Unit E Punch list - Contractors	2 days	Tue 8/5/25	Wed 8/6/25	21FS+1 day							
23		Unit E turnover rooms to owner	1 day	Thu 8/7/25	Thu 8/7/25	22							
24		<b>Units B &amp; C / Work area 2</b>	<b>45 days</b>	<b>Tue 6/24/25</b>	<b>Mon 8/25/25</b>	<b>11</b>							
25		Abatement WA 2	12 days	Tue 6/24/25	Wed 7/9/25	11							
26		Temporary Lighting	1 day	Thu 7/10/25	Thu 7/10/25	25							
27		Above Ceiling duct and duct insulation	15 days	Thu 7/10/25	Wed 7/30/25	25							
28		Suspended ceilings	6 days	Fri 7/25/25	Fri 8/1/25	27FS-4 days							
29		Lighting and Diffusers	2 days	Fri 8/1/25	Mon 8/4/25	28FS-1 day							
30		Suspended ceiling tiles	2 days	Mon 8/4/25	Tue 8/5/25	29FS-1 day							
31		Polished Concrete Floors	12 days	Tue 8/5/25	Wed 8/20/25	30FS-1 day							
32		Rooftop mechanical and electrical work	19 days	Tue 6/24/25	Fri 7/18/25								

Oscoda Area Schools Bid Package 1  
HVAC Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	24							
							T	W	T	F	S	S		
33		AE Punch Lists	1 day	Thu 8/21/25	Thu 8/21/25	31								
34		Unit B & C Punch list - Contractors	2 days	Thu 8/21/25	Fri 8/22/25	33FS-1 day								
35		Units B & C turnover rooms to owner	1 day	Mon 8/25/25	Mon 8/25/25	34								
36		<b>Unit F / Work Area 3</b>	<b>30 days</b>	<b>Thu 7/10/25</b>	<b>Wed 8/20/25</b>	<b>25</b>								
37		Abatement WA 3	10 days	Thu 7/10/25	Wed 7/23/25	25								
38		Temporary Lighting	1 day	Thu 7/24/25	Thu 7/24/25	37								
39		CMU Top of wall demo for ductwork	1 day	Thu 7/24/25	Thu 7/24/25	37								
40		Above Ceiling duct and duct insulation	15 days	Thu 7/10/25	Wed 7/30/25	25								
41		Suspended ceilings	6 days	Fri 7/25/25	Fri 8/1/25	40FS-4 days								
42		Lighting and Diffusers	2 days	Fri 8/1/25	Mon 8/4/25	41FS-1 day								
43		Suspended ceiling tiles	2 days	Wed 8/6/25	Thu 8/7/25	42FS+1 day								
44		Polished Concrete Floors	10 days	Thu 8/7/25	Wed 8/20/25	43FS-1 day								
45		Rooftop mechanical and electrical work	19 days	Thu 7/10/25	Tue 8/5/25									
46		Final Inspections	3 days	Mon 8/18/25	Wed 8/20/25	44FS-3 days								
47		AE Punch Lists	1 day	Tue 8/19/25	Tue 8/19/25	44FS-2 days								
48		Unit F Punch list - Contractors	1 day	Thu 8/21/25	Thu 8/21/25	47FS+1 day								

Oscoda Area Schools Bid Package 1  
HVAC Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	24							
							T	W	T	F	S	S		
49		Unit F turnover rooms to owner	1 day	Fri 8/22/25	Fri 8/22/25	48								
50		Test and Balance	10 days	Wed 8/6/25	Tue 8/19/25	45								
51		Mechanical Start Up	5 days	Wed 8/13/25	Tue 8/19/25	50FS-5 days								
52		<b>Work area 6</b>	<b>42 days</b>	<b>Mon 5/4/26</b>	<b>Tue 6/30/26</b>									
53		Abatement WA 6 Boiler House	12 days	Mon 5/4/26	Tue 5/19/26									
54		Temporary Lighting	1 day	Wed 5/20/26	Wed 5/20/26	53								
55		Plumbing / Mechanical / Electrical	30 days	Wed 5/20/26	Tue 6/30/26	53								
56		<b>Work area 4</b>	<b>43 days</b>	<b>Thu 6/11/26</b>	<b>Mon 8/10/26</b>									
57		Abatement WA 4	11 days	Thu 6/11/26	Thu 6/25/26									
58		Temporary Lighting	1 day	Fri 6/26/26	Fri 6/26/26	57								
59		Above ceiling duct and duct insulation	15 days	Fri 6/26/26	Thu 7/16/26	57								
60		Suspended Ceilings	8 days	Fri 7/10/26	Tue 7/21/26	59FS-5 days								
61		Lighting and Diffusers	5 days	Thu 7/16/26	Wed 7/22/26	60FS-4 days								
62		Acoustical Ceilings	6 days	Tue 7/14/26	Tue 7/21/26	59FS-3 days								
63		Suspended ceiling tiles	3 days	Mon 7/20/26	Wed 7/22/26	61FS-3 days								
64		Polished Concrete Floors	10 days	Tue 7/21/26	Mon 8/3/26	63FS-2 days								

Oscoda Area Schools Bid Package 1  
HVAC Upgrades

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	24						
							T	W	T	F	S	S	
65		Rooftop mechanical and electrical work	20 days	Tue 6/23/26	Mon 7/20/26	57FS-3 days							
66		AE Punch lists Work area 4	2 days	Tue 8/4/26	Wed 8/5/26	64							
67		Punch list contractors Work area 4	2 days	Thu 8/6/26	Fri 8/7/26	66							
68		Turn work area 4 over to owner	1 day	Mon 8/10/26	Mon 8/10/26	67							
69		<New Task>	1 day?	Mon 5/4/26	Mon 5/4/26								
70		<b>Work Area 5</b>	<b>40 days</b>	<b>Fri 6/26/26</b>	<b>Thu 8/20/26</b>								
71		Abatement WA 5	10 days	Fri 6/26/26	Thu 7/9/26	57							
72		Temporary Lighting	1 day	Fri 7/10/26	Fri 7/10/26	71							
73		Plumbing / Mechanical / Electrical	25 days	Fri 7/10/26	Thu 8/13/26	71							
74		AE Punchlists Work area 5	2 days	Fri 8/14/26	Mon 8/17/26	73							
75		Final Inspections	4 days	Fri 8/14/26	Wed 8/19/26								
76		Punch lists contractors	2 days	Tue 8/18/26	Wed 8/19/26	74							
77		Turn over to owner	1 day	Thu 8/20/26	Thu 8/20/26	76							

**PART 1 – GENERAL**

**1.01 PROJECT DESCRIPTION**

**A. Oscoda Area Schools 2024 Bond Program – Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection**

**1.02 CONTRACTORS USE OF PREMISES**

- A. Contractors shall limit their use of the Project site for Work and for storage, to allow for:
1. Work by other Contractors.
- B. Contractors shall coordinate their use of the Project site under the direction of the Construction Manager.
- C. Contractors shall assume full responsibility for the protection and safekeeping of materials and equipment stored on the site. No security will be employed.
- D. Each Contractor shall move any stored material or equipment under their control if it interferes with operations of the Owner or other Contractors, as directed by the Construction Manager.
- E. Contractors shall obtain and pay for additional storage or work areas needed for operations not allowed on the site.

**1.03 OWNER OCCUPANCY**

- A. The owner intends to occupy the Project by **3/1/2026**. All contractors must comply with this requirement.

**1.04 OWNER FURNISHED PRODUCTS**

- A. Products furnished and paid for by the Owner are described in the Specifications and in the Bid Division List (Section 00309).
- B. Owner's Responsibilities Regarding Owner-Furnished Products:
1. Arrange for and deliver necessary shop drawings, product data and samples to the installing contractor,
  2. Arrange and pay for product delivery to the site, in concert with the Short-Term Construction Activities Plan,
  3. Arrange for the suppliers to submit bills of materials to Contractors,
  4. Inspect deliveries jointly with Contractors,
  5. Submit claims for transportation damage,
  6. Arrange for replacement of damaged, defective, or missing items,
  7. Arrange for manufacturer's warranties, bonds, service, and inspections, as required.



- C. Contractor's Responsibilities Regarding Owner-Furnished Products:
1. Designate needed delivery dates for each product in the Short-Term Construction Activities Plan,
  2. Review shop drawings, product data and samples,
  3. Review and return Owner-Furnished shop drawings, data and samples with notification of any discrepancies or problems anticipated in use of the product, within 2 weeks,
  4. Promptly inspect products jointly with the Owner, and record shortages, damaged items and defective items,
  5. Handle products at the site, including uncrating and storage,
  6. Protect products from exposure to elements, and other forms of damage,
  7. Assemble, install, connect, adjust and finish products as stipulated in the Specification,
  8. Repair or replace items damaged by Contractor,
  9. Dispose of all crating, wrapping, and trash related to the material.

**END OF SECTION 01010**

**PART 1 – GENERAL**

**1.01 NORMAL WORK HOURS**

A. 7 a.m. to 5 p.m., Monday through Friday.

**1.02 EXCEPTIONS**

- A. Necessary variations of normal work hours shall only occur with the express approval of the Construction Manager on the Owner's behalf.
- B. As a condition to the contract, the Contractor agrees that no premium-time, over-time or other special rate shall be charged for the scheduled completion of the project for any reason or cause.
- C. It will be the responsibility of each Contractor to provide an adequate work force to assure the timely completion of all Work.
- D. The Contractor will work whatever hours required (overtime, weekends, holidays) to complete their work and allow for the completion of all other work to achieve final completion in the time frames required by the Owner.

**END OF SECTION 01030**

**PART 1 – GENERAL**

**1.01 CONSTRUCTION MANAGEMENT**

- A. This is a Construction Management project. There is no General Contractor. All Contractors on this Project are Prime Contractors. The Owner will award contracts for all Bid Divisions involved in the Project. The Project will be controlled and administered by a Construction Manager.

**1.02 WORK ASSIGNMENTS**

- A. Nothing contained on the Contract Documents, and especially in the work scope of any Bid Division, shall be construed as a Work assignment to any construction trade industry. Each Contractor is responsible for their own decisions on Work assignments and shall make them in accord with the prevailing practice in the areas of the Project, and in such a way that neither their progress nor the progress of others will be adversely affected.
- B. Disputes that may arise over improper assignments or over assignments claimed by more than one Contractor shall be settled immediately by the Contractors and shall in no case result in a slowdown or stoppage of Work of any Contractor.

**1.03 RETAINAGE ON OWNER PURCHASED ITEMS**

- A. The Owner may retain an amount of Five Thousand (\$5,000.00) or ten percent (10%); whichever is the larger amount, on material and/or equipment purchased from suppliers for inclusion in the Work, until such time as it is satisfactorily installed. The purpose of this provision is to ensure proper conformance to the Contract Documents.

**1.04 PERFORMANCE OF WORK**

- A. All Contractors shall provide weekly input to aid in the preparation of the Look Ahead Schedule by which the Project will be built. Consequently, it is the responsibility and obligation of each Contractor to utilize their manpower and resources according to the commitments made under the Look Ahead Schedule.

**1.05 PROMPTNESS OF EXECUTION**

- A. It is the intention of the Owner to complete the Project in the fastest practical time frame. Whereas varying conditions inherent in the construction process will affect the progress of the Work, it is the intent of each construction contract that the Contractor maintain the progress pace set forth in the CAP schedule.

**1.06 PROGRESS PAYMENTS**

- A. It is the intention of the Owner to recognize timely performance prescribed in the CAP. Contractors who maintain specified progress will be eligible for 100% Progress Payments.
- B. Contractors who fail to maintain specified progress may be subject to retainage up to 100% of Progress Payments, at such times as those Contractors are judged by the Construction Manager, and/or the Project Architect, to be behind schedule.

**1.07 PAYMENT FOR STORED MATERIALS**

- A. As a means of eliminating cost escalation on available items of material and equipment, and in the interest of obtaining competitive Bids, the Owner will provide payment for contract items purchased early and stored on site, and in specific pre-approved instances, off the Project site as well. In order to qualify for such payment, the material or equipment must be safely stored, protected, and insured against loss or damage, inspected and dedicated to this Project only. Any extra cost of off-site storage is to be included as part of the Bid Proposal.

- B. Materials stored on the site shall be in the area designated by the Construction Manager. Materials or equipment lost through theft, or mishandling, shall be replaced by the Contractor, without cost to the Owner. The Contractor receiving materials shall provide and maintain protection of stored materials at no additional cost to the Owner. The contractor shall retain responsibility for any loss, damage or replacement costs of any and all stored materials.
- C. Requests for payment for materials delivered and stored at the site must have acceptable itemized bills attached and available at the time of delivery.

**1.08 SCHEDULE OF VALUES**

- A. The Schedule of Values (Section 00670) shall include the following mandatory items for any Contractor who provides on-site labor as a part of their Contract:

- 1. Labor for each portion of the work to be performed.
- 2. Materials for each portion of the work to be performed.
- 3. Performance Bond and Labor & Material Payment Bond (when required by Owner).  
Value: Actual Cost of Bonds
- 4. Daily housekeeping and clean-up inclusive of any special cleaning and preparation required by the specifications for delivering the building for the Owners occupancy.  
Value: Two percent (2%) of the total Contract Amount
- 5. Retainage / Punch List  
Value: Ten percent (10%) of the total Contract Amount

- B. Monthly allocations shall be made to each item as appropriate and as directed by the Construction Manager.
- C. The value of the Housekeeping/Final Clean-Up item shall be two percent (2%) of the Contract value, or as described by the Construction Manager.

**1.09 MATERIAL AND EQUIPMENT EXPEDITING**

- A. The Construction Manager will initiate and coordinate an expediting program on the Owner's behalf in cooperation with each Contractor, incorporating all critical items of material and/or equipment provided under the various Bid Division contracts.
- B. Each Contractor shall provide the Construction Manager with a completed Material and Equipment Purchase/Delivery list and as a part of the Bid Division Descriptions. The Contractor's purchase order issue date, supplier name and phone number and the delivery date for each material and equipment item required for the project must be provided.
- C. Each Contractor shall further cooperate by keeping the Construction Manager informed of all changes in the commitments previously indicated in the Material and Equipment Purchase/Delivery list and when deemed necessary by the Construction Manager, provide source contacts for direct expediting by the Construction Manager.
- D. The Contractor must require all suppliers to notify the Contractor's office a minimum of twenty-four (24) hours prior to the delivery of any materials or equipment so the Contractor is present to receive and unload the delivery.
- E. If a Contractor is not present on the job site to receive and unload the Contractor's material or equipment the Construction Manager may have the owner authorize others to perform the work. All costs associated with such actions will be deducted from the payments due the Contractor.

**1.10 PROTECTION OF THE WORK OF OTHERS**

- A. Contractors shall consider protection of finished Work of prime importance. Care shall be taken by Contractors not to damage completed Work of other Contractors, and to provide adequate protection to their own completed Work. Contractors who damage the work of others or existing finishes shall be back charged all costs associated with repairing or replacing the damaged work.
- B. When moving laborers and/or materials across floors, grades, roofs, other vulnerable surfaces, or through occupied areas, the Contractor shall provide adequate surface protection to prevent damage to surfaces.

**1.11 MANDATORY ATTENDANCE AT MEETINGS**

- A. Each Contractor shall provide a representative of the Contractor authorized and empowered to enact decisions regarding schedule compliance, manpower commitments and cost changes at all Project and Progress Meetings.

**1.12 PRE ON-SITE ACTIVITY MEETING**

- A. Each Contractor is required to meet on the site with the Field Construction Manager prior to beginning their Work. The purpose of this meeting is to review the intent of the Contract Documents as they pertain to the Contractor's Work, and to integrate the Contractor's schedule into the Short-Term Construction Activities Plan for the Project.

**1.13 RETURN ACTIVITIES**

- A. Each Contractor is required to report to the Field Construction Manager prior to resuming Work on the Project after an absence from the site of one or more working days. The purpose of reporting is to make the Field Construction Manager aware of the Contractor's re-involvement with the Project, and to provide an update regarding any conditions that could affect the continuing Work of the Contractor.

**1.14 CUTTING AND PATCHING**

- A. Each Contractor shall make arrangements with the Construction Manager for fitting their Work into the Project, and shall coordinate all fitting with other Contractors. Whenever any contractor has been given sufficient information as to required openings prior to beginning their Work, they shall pay the cost for cutting and/or restoring if they fail to provide proper required openings.
- B. Each Contractor shall be responsible for any cutting, fitting and patching that may be required to complete their Work if they have failed to properly notify the Construction Manager and preceding Contractors of any openings required. Contractors shall not endanger the Work of any other Contractor by cutting, excavating or otherwise altering any Work, and shall not cut or alter the Work of any other contractor except with the consent of the Construction Manager. Any costs caused by defective or ill-timed Work shall be borne by the party responsible for such Work.
- C. Cutting or restoring performed by any Contractor, for work that is rejected by the Architect shall be corrected under the direction of the Construction Manager, as instructed by the Architect. The Contractor responsible for the defective restoration shall incur the cost of such Work.
- D. Openings over six inches in diameter must be formed by the concrete contractor(s).
- E. Cutting and patching of concrete floors and decks shall be performed in a neat and workman like manner, using a coring machine. After coring, each Contractor shall pack and grout openings around sleeves or other Work penetrating floors and decks.

- F. No Contractor shall do any cutting that may impair the strength of any building or its components. No holes, except for small screws or bolts, may be drilled in beams or other structural members for the purpose of supporting or attaching Mechanical Work, without prior approval from the Architect.
- G. Each Contractor shall be responsible for the cutting and patching of holes and openings through existing walls, partitions, floors, ceilings, and roofs necessary for the installation of their work. If the location for a hole or opening is through an existing joist, beam, or column, the Contractor shall notify the Construction Manager who, after consultation with the Architect, will instruct the Contractor how to proceed.
- H. Each Contractor shall be responsible for the closing and patching of holes and openings through existing walls, partitions, floors, ceilings, and roofs created by demolition work they are shown to complete unless noted otherwise.
- I. Temporary removal and replacement of all ceilings not scheduled to be replaced shall be the responsibility of the Contractor requiring access.
- J. The Contractor responsible for patching shall provide both the rough (substrate) and finish surfaces. They shall employ only qualified tradesmen to assure that all work is done in a neat and workmanlike manner. All patching shall match adjacent surfaces.

**1.15 BLOCKING, BACKING AND GROUNDS**

- A. Each Contractor shall be responsible for providing the blocking, backing and grounds necessary for the installation of their work unless specifically noted on the drawings in which case said blocking, backing, and grounds shall be provided by the Bid Division supplying shown backing material.

**1.16 ACCESS PANELS**

- A. Each Contractor shall be responsible for furnishing the necessary access panels for items of work installed under their contract.
- B. Installation of all access panels shall be the responsibility of the contractor erecting the wall or ceiling system.
- C. If not specified, these access panels shall be approved by the Architect prior to installation.

**END OF SECTION 01040**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. All Applications for Payment must be submitted on a “Contractor Invoice Form.”
- B. Contractor Invoice Form(s) will be sent to contractors each month by the Construction Manager. The Contractor Invoice Form must be returned to the Construction Manager by the due date (located in the upper left hand corner of the form) in order to be included in the current month’s Cost Control Manual to be submitted to the Owner. The due date can also be found on “Attachment A” of the Owner-Contractor contract.
- C. Any completed Contractors Invoice Form received by the Construction Manager **later** than the contract established due date **will not** be accepted and **will need to be re-billed the following month.**

**1.02 SWORN STATEMENTS AND WAIVERS**

- A. All Applications for Payment must be accompanied by a Sworn Statement and applicable waivers.
- B. For complete instructions on preparing Sworn Statements and Waivers, please reference Section 01050 – Sworn Statements and Lien Waivers.
- C. Final Sworn Statement and Full Unconditional Lien Waivers must be provided prior to the release of the final payment or exchanged for final payment by presenting them in person.

**1.03 SCHEDULE OF VALUES**

- A. All billings are processed on the basis of approved Schedules of Values. Absolutely NO CHANGES may be made to approved Schedule of Values.

**1.04 CHANGE ORDERS**

- A. Increases or decreases in the Contract Amount shall be through change orders.
- B. Each Change Order shall be listed as a new line item on the Contractor Invoice Form. This is the only way a change order will be processed for payment.

**1.05 APPROVAL OR REJECTION OF APPLICATION FOR PAYMENT**

- A. Approved Applications for Payment will be included in the current month Cost Control Manual submitted to the Owner for their approval and payment. Following approval the Owner will process payments and forward them to the Construction Manager for accompaniment of appropriate waiver(s), and payment will be sent on to Contractor.
- B. Contractors with Applications for Payment that were adjusted or rejected will be contacted by Wolgast for explanation.
- C. No payment will be issued through the Owner for any progress payment when the substantiating sworn statement and lien waiver(s) from the previous payment have not been received by the Construction Manager.

**END OF SECTION 01045**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Sworn Statement shall be included with each Application for Payment.
- B. A sample Sworn Statement follows as Pages 2 and 3 of this Section.
- C. Page 1 of the Sworn Statement shall contain all necessary Project information, including
  - 1. Date of Sworn Statement.
  - 2. County in which the deponent is at the time of the completion of the Sworn Statement.
  - 3. Deponent name.
  - 4. Contractor name on whose behalf the deponent is making statement.
  - 5. County in which the Project is situated.
  - 6. Project name and site location.
  - 7. Deponent signature and typewritten name.
  - 8. Notary name, signature, and commission expiration date.
- D. Page 2 of the Sworn Statement shall contain all necessary Project information, including:
  - 1. Project name and site location.
  - 2. Subcontractor/Supplier listings as submitted for approval at the beginning of the Project.
  - 3. Description of work to be completed by each subcontractor/supplier.
  - 4. Total contract amount for each subcontractor/supplier.
  - 5. Listings of amounts paid, amounts owing, retentions held, and balances to complete.

**1.02 WAIVERS**

- A. All Applications for Payment must be accompanied by a Sworn Statement and applicable waivers.
- B. Sample “partial” and “full” waivers follow as Pages 4 and 5 of this Section.

**1.03 APPLICATION AND CERTIFICATE FOR PAYMENT**

- A. No payment will be issued through the Owner for any progress payment when the substantiating sworn statement and lien waiver(s) from the previous payment have not been received by the Construction Manager.
- B. For additional information and instructions on the Application and Certificate for Payment, please reference Section 01045.



**Sample Sworn Statement**

STATE OF MICHIGAN  
COUNTY OF \_\_\_\_\_

\_\_\_\_\_ Being duly sworn, deposes and says that  
\_\_\_\_\_ Is the Contractor for an improvement to the following described real property situated in  
\_\_\_\_\_ COUNTY, MICHIGAN, known as \_\_\_\_\_. That the following is a statement of each subcontractor and  
supplier and laborer, for which laborer the payment of wages for fringe benefits and withholdings is due but unpaid, with whom the contractor has  
subcontracted for performance under the contract with the owner or lessee thereof, and that the amounts due to the persons as of the date hereof  
are correctly and fully set forth opposite their names, as follows on Page 2.

That the contractor has not procured materials from, or subcontracted with, any other person other than those set forth and owes no money for the  
improvement other than the sums set forth.

Deponent further says that he or she makes the foregoing statement as the contractor for the purpose of representing to the owner or lessee of the  
above described premises and his or her agents that the above described property is free from claims of construction liens, or the possibility of  
construction liens, except as specifically set forth and except for claims of Construction Lien Act, Act No. 497 of the Public Acts of 1980, as amended,  
being Section 570.1109 of the Michigan Compiled Laws.

\_\_\_\_\_  
Deponent Signature

\_\_\_\_\_  
Deponent Name – Typewritten

\_\_\_\_\_  
Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_.

\_\_\_\_\_  
Notary Public Signature

\_\_\_\_\_  
Notary Public Name – Typewritten

My commission expires: \_\_\_\_\_

Warning to the owner; an owner or lessee of the above described property may not rely on this sworn statement to avoid the claim of a  
subcontractor, supplier, or laborer who has provided a notice of furnishing or a laborer who may provide a notice of furnishing pursuant to Section  
109 of the Construction Lien Act to the designee or the owner of lessee if the designee is not named or has died.

Warning to the deponent; a person, who with intent to defraud, gives a false sworn statement is subject to criminal penalties as provided in Section  
110 of the Construction Lien Act, Act No. 497 of the Public Acts of 1980, as amended, being Section 50.1110 of the Michigan Compiled Laws.



**PARTIAL UNCONDITIONAL WAIVER OF LIEN  
Subcontractor/Supplier**

Check No. \_\_\_\_\_

Amount: \$ \_\_\_\_\_

Invoice#: \_\_\_\_\_

I/we have a contract with **Oscoda Area Schools** to provide

\_\_\_\_\_ For the improvement of the property described as **Oscoda Area Schools 2024 Bond Program – Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection** , and hereby waive my/our construction lien to the amount of \$ \_\_\_\_\_ for labor/materials provided through \_\_\_\_\_.

This waiver, together with all previous waivers, if any, (circle one) DOES / DOES NOT cover all amounts due to me/us for contract improvement through the date shown above.

\_\_\_\_\_  
(Name of Lien Claimant)

By: \_\_\_\_\_ Signed on: \_\_\_\_\_  
(Signature of lien claimant or authorized officer or agent of lien claimant) (Date)

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

**FULL UNCONDITIONAL WAIVER OF LIEN  
Subcontractor/Supplier**

Check No. \_\_\_\_\_

Amount: \$ \_\_\_\_\_

Invoice#: \_\_\_\_\_

My/our contract with **Oscoda Area Schools** to provide

\_\_\_\_\_ For the improvement of the property described as **Oscoda Area Schools 2024 Bond Program Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection**, having been fully paid and satisfied, all my/our construction lien rights against such property and hereby waived and released.

\_\_\_\_\_  
(Name of Lien Claimant)

By: \_\_\_\_\_ Signed on: \_\_\_\_\_  
(Signature of lien claimant or authorized officer or agent of lien claimant) (Date)

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

**END OF SECTION 01050**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Change Event Form will be used to document any request for a change in the scope of the Work throughout the construction process, and establish owner and architect approval prior to preparing a change order or having work performed.
- B. The Change Event Form will only be used when it IS NOT NECESSARY for work to be performed immediately.

**1.02 PROCESSING OF CHANGE EVENT FORMS**

- A. The Owner, Architect, Engineer, Construction Manager or Contractor may initiate a request for change during the Project in the form of a bulletin/proposal request, construction change directive, request for information, or value engineering proposal. Requests for changes shall be submitted to the Construction Manager for preparation and distribution of the Change Event Form.
- B. The Change Event will be accompanied by a copy of all related sketches, drawings, specifications, instructions, etc.
- C. The Construction Manager will forward the Change Event to the Contractor for the purposes of obtaining an itemized quote (including labor, material, equipment, units, rates, and subtotals) for the changes requested.
- D. The Contractor will complete and return the Change Event Form within five (5) days, or less, to the Construction Manager.
- E. The Construction Manager will review all Change Events and itemized detail for accuracy and validity within 48 hours of receiving said information.
- F. If the Construction Manager approves the costs or deductions submitted by the Contractor in the Change Event, the Construction Manager will:
  - 1. Forward one (1) copy of the Change Event with itemized detail to the Architect for review and endorsement, stipulating the date by the endorsed Change Event is to be returned.
  - 2. Discuss the Change Event and costs or deductions with the Architect to secure their endorsement.
  - 3. Forward one (1) copy of the Change Event with itemized detail to the Owner for approval and signature.
- G. After receiving the endorsed Change Event(s) timely from the Architect and Owner, the Construction Manager will prepare a Change Order for Contractor signature. The Contractor will sign the Change Order, acknowledging notice to proceed with change, and return a copy back to the Construction Manager.
- H. Only Change Events with the Architect's and Owner's signature of approval and acceptance will be processed into Change Orders.

**1.03 PRICING GUIDELINES FOR CHANGE EVENTS**

- A. Pricing Guidelines for Change Events that will be considered for Change Orders shall be fully detailed and itemized showing each of the following:
  - 1. Labor: All field labor indicating worker name, date, and hours worked and hourly rate; hourly rate shall be based on straight time only and shall include the labor classification.

2. Fringes: All established payroll taxes, assessments and fringe benefits on the labor in 7.3.2.1; this may include, but is not limited to, FICA, Federal and State unemployment, Health and Welfare and Workers Compensation; each of the fringes is to be a separate line item.
3. Material: All material purchased by the Contractor and incorporated into the changed Work, showing quantities, unit costs and costs of each item as appropriate; material costs will only be allowed at the Contractor's actual cost including any and all discounts, rebates or related credits. Only one third (33 percent) of the cost of reusable materials for each use, such as formwork lumber, shoring or temporary enclosures will be allowed.
4. Equipment: Rental Equipment – charges for certain non-owned, heavy or specialized equipment up to 100 percent of the documented rental costs; no rental charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; downtime due to Contractor caused delays, repairs, maintenance, late fees and weather will not be allowed. Owned Equipment – charges for certain owned, heavy or specialized equipment up to 100 percent of the cost listed by the Associated Equipment Dealers Blue Book; no charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; only the actual time the equipment is necessary to be in use to perform the work will be allowed; downtime due to Contractor caused delays, repairs, maintenance and weather will not be allowed.
5. A total amount of ten (10) percent of the total of all labor, materials and equipment performed by the Contractor's own forces shall be allowed for the Contractor's combined overhead and profit.
6. A total amount of ten (10) percent of the total of all extra work performed by the Contractor's Subcontractor(s) shall be allowed for the Contractor's combined overhead and profit.
7. For work deleted, that would have been completed by the Contractor or the Contractor's Subcontractor(s) an amount equaling the cost of the Work plus an amount equaling five (5) percent of the work shall be credited to the owner.

**1.04 TIME LIMIT**

- A. Contractor must return the Change Event and respective price quotations within five (5) working days, unless noted otherwise on the Construction Management issued Change Event.
- B. Failure to return the completed Change Event within the predefined time period will indicate the contractor shall have no charge for the associated work within their bid division per the Change Event at no additional cost to the Owner, Construction Manager and Architect.

**END OF SECTION 01051**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Change Order Document is the legal instrument used to modify the Contract Documents.
- B. Change Orders will be prepared, as necessary, following the acceptance of the Change Event amount by the Owner (Section 01051).
- C. A sample Change Order follows as page 2 of this Section.

**1.02 PROCESSING OF CHANGE ORDERS**

- A. All changes and potential changes to the Project shall be documented by using the Change Event Form (Section 01051).
- B. Complete and approved Change Events will be converted into Change Orders as necessary.
- C. One (1) original Change Order shall be prepared by the Construction Manager and forwarded to Contractor for signature. Signatory parties shall include: the Contractor only on Change Order.

**1.02 PRICING GUIDELINES**

- A. Pricing Guidelines for Change Events that will be considered for Change Orders shall be fully detailed and itemized showing each of the following:
  - 1. Labor: All field labor indicating worker name, date, and hours worked and hourly rate; hourly rate shall be based on straight time only and shall include the labor classification.
  - 2. Fringes: All established payroll taxes, assessments and fringe benefits on the labor in 7.3.2.1; this may include, but is not limited to, FICA, Federal and State unemployment, Health and Welfare and Workers Compensation; each of the fringes is to be a separate line item.
  - 3. Material: All material purchased by the Contractor and incorporated into the changed Work, showing quantities, unit costs and costs of each item as appropriate; material costs will only be allowed at the Contractor's actual cost including any and all discounts, rebates or related credits. Only one third (33 percent) of the cost of reusable materials for each use, such as formwork lumber, shoring or temporary enclosures will be allowed.
  - 4. Equipment: Rental Equipment – charges for certain non-owned, heavy or specialized equipment up to 100 percent of the documented rental costs; no rental charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; downtime due to Contractor caused delays, repairs, maintenance, late fees and weather will not be allowed. Owned Equipment – charges for certain owned, heavy or specialized equipment up to 100 percent of the cost listed by the Associated Equipment Dealers Blue Book; no charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; only the actual time the equipment is necessary to be in use to perform the work will be allowed; downtime due to Contractor caused delays, repairs, maintenance and weather will not be allowed.
  - 5. A total amount of ten (10) percent of the total of all labor, materials and equipment performed by the Contractor's own forces shall be allowed for the Contractor's combined overhead and profit.

6. A total amount of ten (10) percent of the total of all extra work performed by the Contractor's Subcontractor(s) shall be allowed for the Contractor's combined overhead and profit.
7. For work deleted, that would have been completed by the Contractor or the Contractor's Subcontractor(s) an amount equaling the cost of the Work plus an amount equaling five (5) percent of the work shall be credited to the owner.



**CHANGE ORDER**

---

PROJECT:

PROJECT NO:

CHANGE ORDER NO.:

CHANGE ORDER DATE:

CONTRACT DATE:

CONTRACT NO.:

CONTRACTOR:

ARCHITECT:

OWNER:

---

It is hereby agreed to make the following changes to the Contract:

- 1. QR#
- 2. N/A
- 3. N/A
- 4. N/A
- 5. N/A

This work described by this Change Order becomes a part of and is to be performed by the same terms as the existing Contract. This Change Order must be signed by the Owner, Architect, and Contractor to be valid.

The Original Contract Sum.....	\$
Net change by previously authorized Change Orders.....	\$
The Contract Sum prior to this Change order.....	\$
The Contract Sum will be <input type="checkbox"/> increased / <input type="checkbox"/> decreased by this Change Order.....	
The new Contract Sum including this Change Order is.....	\$

Contractor \_\_\_\_\_ Architect \_\_\_\_\_ Owner \_\_\_\_\_

By: \_\_\_\_\_ By: \_\_\_\_\_ By: \_\_\_\_\_

Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_

DISTRIBUTION - FULLY EXECUTED CHANGE ORDERS ARE COPIED AND DISTRIBUTED AS FOLLOWS:  
White (original) – Owner; Blue – Construction Manager; Green – Contractor; Yellow – Architect

**END OF SECTION 01053**

**PART 1 – GENERAL**

**1.01 LAYOUT AND MEASUREMENTS**

- A. The responsibility for accurate layout and measurement of the Work of each Contractor is their own. In addition, each Contractor shall verify the dimensional accuracy of the Work upon which their own Work relies before they begin their Work. They shall report all inaccuracies to the Construction Manager, and shall not proceed until all corrections are made. If a Contractor proceeds with their Work on dimensionally inaccurate Work of another Contractor, they shall be liable for the cost of corrections to their own Work when the error is corrected, and shall cooperate in the correction as directed by the Construction Manager.
- B. The Owner, through the Construction Manager, will provide a bench mark and baseline for all Contractors' reference.
- C. If the Construction Manager performs layout work or must arrange for others to perform layout work that is the responsibility of the Contractor, those costs will be charged to the Contractor. The costs will be submitted to the Owner and the Owner will deduct those costs from the Contractor's contract payment.

**END OF SECTION 01055**

**1.01 PREVAILING WAGE**

A. There is no prevailing wage on this project.

**END OF SECTION 01060**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and type of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the specifically names code or standard.
3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Owner, to deliver to the Owner all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Owner, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Owner.

B. Related Work Described Elsewhere:

1. Specific naming of codes or standards occurs on the Drawings and other Sections of these specifications.

**1.02 QUALITY ASSURANCE**

A. Familiarity with Pertinent Codes and Standards.

1. In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

B. Rejection of Non-Complying Items.

1. The Owner reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements.
2. The Owner further reserves the right and without prejudice to other recourse the Owner may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. AASHTO – American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004.

ACI – American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48219

AISC – American Institute of Steel Construction, Inc., 1221 Avenue of the Americans, New York, New York, 10020.

ANSI – American National Standards Institute (successor to USASI and ASAO), 1430 Broadway, New York, New York 10018.

ASTM – American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

AWS – American Welding Society, Inc., 2501 N.W. 7<sup>th</sup> Street, Miami, Florida 33125.

AWWA – American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235.

BOCA – Building Officials Code Administrators International, Inc. 17926 South Halsted Street, Homewood, Illinois 60460.

CRSI – Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610.

CS – Commercial Standard of NBS, U.S. Department of Commerce, Government Printing Office, Washington, D.C. 20402.

FGMA – Flat Glass Marketing Association, 3310 Harrison, Topeka, Kansas 66611.

State of Michigan Fire Marshall Bulletin 412.0.

NAAMM – The National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, Illinois 60302.

NEC – National Electric Code (see NFPA).

NEMA – National Electrical Manufacturer’s Association, 155 East 44<sup>th</sup> Street, New York, New York 10017.

NFPA – National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210.

SDI – Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125.

SSPC – Steel Structures Painting Council, 4400 Fifty Avenue, Pittsburgh, Pennsylvania 15213.

TCA – Tile Council of America, Inc., P.O. Box 326, Princeton, New Jersey 08540.

UL – Underwriters’ Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611.

Fed. Specs, and Fed. Standards: Specifications Sales (3FRI), Building 197, Washington Navy Yard, General Service Administration, Washington, D.C. 20407.

UBC – Uniform Building Code, International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601.

**END OF SECTION 01085**

**PART 1 – GENERAL**

**1.01 ALTERNATES**

- A. This section identifies each alternate by number and describes the basic changes to be incorporated into the work, only when that alternate is made a part of the Work by specific provisions in the Owner-Contractor Agreement.
- B. Related Requirements in other parts of the Project Manual:
1. Method of quotation of the cost of each alternate, and the basis of the Owner’s acceptance of alternates: Bidding Documents
  2. Incorporation of alternates into the Work: Owner-Contractor Agreement.
- C. Related Requirements Specified in Other Sections:
1. Part 1.01: Description of Work
  2. Sections of the Specifications as listed under the respective Alternates.
- D. Referenced sections of specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each Alternate.
- E. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each Alternate and to provide the complete construction required by the Contract Documents.
- F. The Owner reserves the right to accept the proposed amount for any alternate at any time during the active construction of the project. If the Owner elects to accept an alternate after the Owner-Contractor contract has been issued, the work shall be added to the contract by change order.

**1.02 DESCRIPTION OF ALTERNATES**

Alt. C1: Asphalt path around Richardson Elementary School. Provide pricing to add 10 ft. asphalt path around Richardson.

Alt C2: Sprinklers around the Community Center. Provide pricing to add sprinklers to the areas surrounding Richardson Elementary.

Alt. C3: Sprinklers around the Community Center. Provide pricing to add sprinklers to the areas surrounding the community center as shown on the drawings.

Alt. C4: Grill Canopy Concrete Pad Expansion. Provide pricing to expand the concrete pad as shown on drawings.

Alt. C5: Repave small loop north of Richardson Elementary School. Provide pricing to repave path.

Alt. C6: Repave large loop in front of Richardson Elementary School. Provide pricing to repave large loop.

Alt. A1: Grill Canopy. Provide pricing to add grill canopy and half height walls as shown on Drawings.

Alt. A2: Wall Padding in Fieldhouse. Provide pricing to add wall padding to all faces of the field house and along supplementary rooms as shown on the drawings.

**END OF SECTION 01100**

**PART 1 – GENERAL**

**1.01 PRE-CONSTRUCTION MEETINGS**

- A. Prior to the initiation of on-site activity, a meeting will be held with all Bid Division Contractors for the purpose of planning, scheduling, and coordinating an orderly initiation of on-site construction activity. Attendance at this meeting is required of all Contractors. The Construction Manager will advise all Contractors of the time and location of this meeting.
- B. A representative of the contractor authorized to enact decisions regarding schedule, manpower commitments and costs must attend the pre-construction meeting.

**1.02 PRE-CONSTRUCTION CONFERENCES**

- A. Each Contractor is required to meet on the site with the Construction Manager prior to beginning their Work. The purpose of this meeting is to review the intent of the Contract Documents as they pertain to the Contractor's Work, and to integrate the initiation of that Work with the Work already in progress on the site.

**1.03 PROGRESS AND PROJECT MEETINGS**

- A. Contractors active on-site shall be required to attend Progress and Project Meetings when called by the Construction Manager. These meetings are for the purpose of planning and assessing construction progress and for discussing problems of mutual concern.
- B. It is mandatory that any contractor actively engaged in work on site shall be required to have a representative of the contractor authorized and empowered to enact decisions regarding schedule, manpower commitments and costs and their superintendent be in attendance at these meetings, or the Owner may withhold the Contractor's payment.
- C. All decisions, instructions, and interpretations given by the Owner or their designated representatives at these meetings shall be conclusive and shall be binding on the Contractors.
- D. The proceedings of such meetings will be recorded and posted. Copies will be forwarded to Contractors.

**END OF SECTION 01200**

**PART 1 – GENERAL**

**1.01**

- A. Contractor shall be solely responsible to submit all shop drawings, product data, and samples, or other items required by the Construction Documents hereinafter referred to as submittals to the Construction Manager for processing and forwarding to the Architect for their review.
- B. Submittals shall be delivered to the Construction Manager's office in accordance with the procedures and dates required by the Construction Documents and/or this section, Section 01300, of the project manual (specifications) whichever is more stringent in its requirement. All submittals shall be provided to the Construction Manager within 30 calendar days of receipt of the signed contract or Notice to Proceed unless specified otherwise in the Construction Documents.

**1.02 SUBMITTALS - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

- A. The Contractor shall submit to the Construction Manager individual submittals either via Procore or email. All files must include the specification number, item number and name as indicated in the submittal log.
- B. Contractor shall provide electronic copies of submittals. The submittals shall be in PDF format only. COLOR SAMPLES MUST BE SUBMITTED AS PHYSICAL SAMPLES.
- C. In submitting shop drawings, product data and samples, each Contractor represents that they have checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. All submittals must be stamped or signed by the contractor responsible for submitting, to attest to their review.

**ALL SUBMITTALS MUST BE ACCOMPANIED BY THE WOLGAST CORPORATION SHOP DRAWING / SUBMITTAL FORM (see Page 2 of this section).**

- D. Any submittal not accompanied by the Wolgast Corporation Shop Drawing / Submittal Form will be returned to the contractor for resubmittal.
- E. The Submittal Log provided as part of the Bid Division Descriptions shall be a guideline only and is not to be a representation of every or all submittals required for the completion of the Project. The Contractor shall be required to provide all items and perform all work in complete compliance with the Contract Documents.
- F. The Contractor shall not be relieved of the responsibility for any deviation in the work required by the Contract Documents, or any errors and omissions contained in shop drawings, product data; samples, or other submittal data reviewed and returned to the Contractor by the Architect. Any work performed prior to the Architect's review shall be subject to removal and replacement at the Contractor's expense.
- G. No portion of the Work requiring submission of shop drawings, product data or samples shall commence until the submission has been reviewed by the Architect. If any work is performed prior to the Architect's review of the required submittal(s), the work shall be subject to removal and replacement at the Contractor's expense if that work does not comply with the requirements of the contract documents.

**1.03 START-UP DOCUMENTS (CONTRACT-AWARD SUBMITTALS)**

- A. (Refer to Sections 00100, 00600, 00650, 00670, 00680, 00690.)

**1.04 CONTRACT CLOSEOUT DOCUMENTS (CLOSE-OUT SUBMITTALS)**

- A. (Refer to Sections 01700, 01720, 01730, and 01740.)

**END OF SECTION 01300**



## TRANSMITTAL FORM FOR WOLGAST CORPORATION SHOP DRAWINGS / SUBMITTAL FORM

CONTRACTOR:	PROJECT TITLE AND LOCATION	
_____ _____ _____ _____	_____ _____ _____ _____	WOLGAST PROJECT NO. _____  DATE SUBMITTED: _____  From Contractor _____ To Architect _____  From Architect _____ To Contractor _____

Pkg. NO.	Pkg. Name	Item No.	CSI Code No.	CSI Code Name	Item Ref. No.	Item Description	Item Type	No. of each	Subcontractors/MFR

The undersigned certifies that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract documents except as otherwise noted. NOTE: Approval of items submitted does not relieve contractor from complying with all requirements of the contract documents.

CONTRACTOR'S COMMENTS:	_____ CONTRACTOR'S NAME  _____ SIGNATURE
------------------------	--

**PART 1 – GENERAL**

**1.01 CONSTRUCTION SCHEDULES**

- A. A Milestone Schedule is provided as part of the bidding documents to indicate dates by which certain critical tasks and/or portions of the project must be completed. The Milestone schedule also indicates the date by which the Project must be 100% complete, receipt of final inspections, occupancy allowed by all governing authorities, and owner move-in.
- B. Based on the Milestone Schedule each Contractor shall submit to the Construction Manager, at or prior to the Pre-Construction Meeting, two (2) copies of the proposed progress schedule for their Work identifying the critical tasks that they must complete to achieve the Milestone Schedule completion dates.
- C. The Construction Manager will utilize the scheduling input from the Contractors for incorporation into the Project Construction Schedule. The Project Construction Schedule will be compiled and distributed to all contractors.
- D. By signing the Owner-Contractor Agreement the Contractor agrees to cooperate with all of the other multiple contractors and to coordinate all construction activities to allow the work of that contractor and all other contractors to meet the completion date(s) established in the Milestone Schedule. The Contractor also agrees that the Project Construction Schedule shall be followed to achieve or improve upon the completion dates for the various tasks in order to attain the final completion of the project by the scheduled completion date.
- E. The Construction Manager will, at times, issue a weekly Look-Ahead Schedule as part of the weekly Contractor Coordination Meetings. The Look-Ahead Schedule will support the Project Construction Schedule and provide specific scheduling information for the Contractor to assure the scheduled completion dates are achieved. The Contractor agrees to comply with the required work identified in the Look-Ahead Schedules.

**END OF SECTION 01350**

**PART 1 – GENERAL**

**1.01 QUALITY CONTROL BY PROJECT ARCHITECT AND CONSTRUCTION MANAGER**

- A. Each Contractor shall comply with the quality control provisions of the Contract Documents.
- B. The quality and completeness of the Work shall be maintained on a day-to-day basis. Inaccurate, faulty, incomplete, and defective Work shall be corrected by the Contractor without continuous prodding by the Construction Manager. Failure to cooperate in this continuous punch list effort may reduce Progress Payments.

**1.02 CONTRACTOR QUALITY CONTROL**

- A. Each Contractor shall be responsible for providing a quality workmanship consistent with the requirements of the Contract Documents. All Work will be of good quality and free from faults and defects. Every care shall be exercised to ensure that the quality specified is the quality provided.
- B. If at any time a Contractor is of the opinion that the quality of their Work is, or will be, jeopardized as a result of rescheduling or coordination of the Project, or for any other reason known to them, they shall stop work immediately and shall inform the Construction Manager of their action and the reasons thereof. The Contractor shall immediately provide a written explanation to the Field Construction Manager and Project Manager for the record, and shall mail a copy to the Architect. Upon investigation by the Construction Manager, a decision will be made on the note of jeopardy, in order to resolve the problem.
- C. Any Contractor who compounds a mistake by installing their product on another Contractor's obviously faulty work will assume responsibility for repair of said work.

**END OF SECTION 01400**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Owner may employ and pay for the services of an independent testing laboratory to perform specified testing as identified in the Bid Division Descriptions.
- B. Contractors shall cooperate with the Laboratory to facilitate the execution of this service.
- C. Employment of the Laboratory shall in no way relieve the Contractor's obligation to maintain the quality of their work.

**1.02 CONTRACTOR'S RESPONSIBILITIES**

- A. Contractors shall cooperate with Laboratory personnel, and shall provide access to Work, and to manufacturers' operations.
- B. Contractors shall provide the Laboratory samples of proposed materials, which require testing.
- C. Contractors shall provide to the Laboratory the preliminary design mix proposed to be used for concrete and other materials, which require control, by the Laboratory.
- D. Contractors shall furnish all test results and coordinate testing with the Construction Manager.
- E. Contractors shall furnish incidental labor and facilities necessary:
  - 1. To provide access to Work to be tested.
  - 2. To obtain and handle samples at the Project site or at the source of the project to be tested.
  - 3. To facilitate inspections and tests.
- F. Contractors shall notify the Laboratory sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.
- G. Contractors shall make arrangements with the Laboratory and pay for additional samples and tests required for Contractor's convenience.
- H. Contractors shall comply with the Project Team's instructions regarding testing.

**END OF SECTION 01410**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The Owner will allow each Contractor to use power and water, where available, for use in construction. All usage will be arranged for by the Construction Manager.

**1.02 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Comply with the National Electric Code.
- B. Comply with federal, state and local codes and regulations and with utility company requirements.

**1.03 MATERIALS, GENERAL**

- A. Cords, connectors, etc. may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

**1.04 TEMPORARY ELECTRICITY AND LIGHTING**

- A. The Electrical Contractor shall furnish, install and maintain a complete and adequate temporary electrical service and distribution system for use by the Construction Manager and all Contractors during the construction period.
- B. The Electrical Contractor shall obtain, provide, and pay for all temporary electrical power service installation from the local power company or the existing building if the capacity is available.
- C. The cost of electrical power consumption shall be paid for by the Owner.
- D. Prior to the start of construction, the Electrical Contractor shall provide temporary power at each construction area and at the office of the Construction Manager. Each temporary service will be sufficient in size to provide continuous power for: twelve (12) ground fault protected, 20 amp, duplex receptables; two (2) 220v, 3 phase 40 amp receptable; 20 amp, 120v grounded temporary lighting circuits to provide for a minimum of one (1) lamp holder for each 200 square feet or a minimum of one (1) per room. Each lamp holder will be provided with one (1) 150 watt lamp and guard with no more than twelve (12) lamps per circuit. The Electrical Contractor shall be responsible for replacing all lamps as required.
- E. All wire and cable shall be sized to hold voltage drop at all outlets to a maximum of 5% total from transformer.
- F. Portions of the permanent electrical system may, at the option of the Electrical Contractor, be used for temporary power and lighting. The Electrical Contractor shall replace all burned out lamps, damaged wiring devices, and plates prior to acceptance of building by Owner. When any part of the permanent electrical system is used for temporary power or lighting, the Electrical Contractor will maintain the system until the final acceptance by the Owner and begin all warranties and guarantees upon the date of substantial completion.
- G. Overtime work requiring standby electricians shall be at the expense of the Contractor requiring the same.
- H. Installation of temporary electrical power and lighting shall be as scheduled by the Construction Manager.
- I. All temporary electrical installations shall be in compliance with the latest National Electrical Code (N.E.C.), MIOSHA or OSHA, whichever is more stringent. Compliance with N.E.C Section 210-8(b) shall be the responsibility of the Electrical Contractor. Assured grounding systems as defined in Exception Number 2 of N.E.C. Section 210-8(b) shall not be used in place of ground fault protection 9.

The Electrical Contractor shall completely remove the temporary electrical service and distribution system when directed to do so by the Construction Manager. The contractors responsible for the installation of all ceilings and partitions shall patch their work as necessary after removal of the temporary electrical system at no additional cost to the Construction Manager or Owner.

- J. The Owner shall pay for all electrical energy consumed during the construction period except for energy consumed to provide power or lighting in excess to those listed in this Article.
- K. Any electrical requirements for power or lighting beyond those listed in this Section (including energy charges) shall be the responsibility of the Contractor requiring them.

**1.05 TELEPHONE SERVICE**

- A. A telephone, if located at the Construction Manager's Field Office, may be provided for all Contractors' use in making local or long-distance calls.

**1.06 WATER**

- A. A temporary water distribution center will be provided in a nearby convenient location. The Contractor shall supply all hoses, etc. beyond that point.

**1.07 SANITARY FACILITIES**

- A. The Construction Manager will arrange for temporary sanitary facilities. Contractors shall not use permanent facilities at the site.

**1.08 TEMPORARY HEAT**

- A. When identified and required by the H.V.A.C. Contractor's Bid Division Description, the H.V.A.C. contractor shall install a heating system (permanent or temporary) in readiness for furnishing temporary heat in the new structure.
- B. When the H.V.A.C. Contractor is required to provide a temporary heating system, the H.V.A.C. Contractor shall operate and maintain the temporary heating system. The temporary heating system shall maintain a minimum temperature at all times of 40 degrees during rough-ins and 60 degrees during finishing operations. The H.V.A.C. contractor shall be responsible for the costs of all temporary electrical work relating to the temporary heating system if the permanent system is not used.
- C. In the event that temporary gas fired or open flame heating devices are used, they shall be of the heat exchanger type properly vented to the outdoors, and shall comply with local and state laws, codes, and ordinances.
- D. Portions of the new heating system may, at the option of the H.V.A.C. contractor, be used for temporary heat providing that all parts of the system are cleaned and restored to prime condition prior to acceptance. The H.V.A.C. contractor shall remove any filters used during the temporary heating period and replace with new filters. In addition, the H.V.A.C. subcontractor shall pay the cost of extending warranty and guarantee periods on any permanent equipment used prior to Substantial Completion. The H.V.A.C. contractor shall completely remove the temporary heating system when directed to do so by the Construction Manager.
- E. When identified and required by the H.V.A.C. Contractor's Bid Division Description, all or portions of the new (permanent) H.V.A.C. system shall be used for temporary heat. When the new/permanent system is used for temporary heat, the H.V.A.C. Contractor shall:

Temporary Utilities

1. Maintain the system throughout its use.
2. At the end of the system's use as a temporary system, the H.V.A.C. Contractor shall replace all filters with new filters.
3. Cover openings in permanent return air ductwork with filter media. Maintain and replace filter media as required so air flow is not restricted.
4. Clean and restore all parts of the system to prime condition immediately prior to final acceptance by the Owner.
5. Provide the full warranty and guarantee of the entire system with the warranty/ guarantee period beginning at the time of final acceptance by the Owner.

F. All fuel costs for Temporary Heat shall be paid fo by the Owner.

**1.09 EXECUTION**

A. Each Contractor shall maintain and operate systems to assure continuous service, and avoid disruption of service.

**1.10 REMOVAL**

- A. Each Contractor shall promptly remove their own temporary materials and equipment when their use is no longer required.
- B. Each Contractor shall clean and repair damage they have caused by temporary installations or use of temporary facilities.
- C. Each Contractor shall restore existing facilities they have used for temporary services to their specified or original condition.

**END OF SECTION 01510**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Each Contractor shall furnish, install, and maintain construction aids required for the performance of their own Work, and shall move or remove them when they are no longer needed for the Work.
- B. Certain construction aids will be provided for and maintained by the Owner as indicated in later paragraphs in this Section.

**PART 2 – PRODUCTS**

**2.01 MATERIALS, GENERAL**

- A. Materials may be new or used, shall be suitable for their intended purposes, and shall not violate the requirements of applicable codes and standards.

**2.02 CONSTRUCTION AIDS**

- A. Each Contractor shall provide all required construction aids and equipment to facilitate the execution of the Work, including scaffolds, staging, ladders, and other such facilities and equipment.
- B. Contractors shall maintain all facilities and equipment in a first-class condition.

**2.03 TEMPORARY ENCLOSURES**

- A. The Construction Manager will arrange for temporary enclosures except those required by section 01900 – 2.01 to separate work areas from the areas of existing buildings occupied by the Owner to prevent penetration of dust or moisture into occupied areas, to prevent damage to existing equipment, and to protect the Owner's employees, customers, and operations from construction work.

**PART 3 – EXECUTION**

**3.01 PREPARATION**

- A. Consult with the Owner, Construction Manager, and other Consultants and review the site conditions and other factors, which could affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the project.

**3.02 GENERAL**

- A. Comply with applicable requirements of the Specifications.
- B. Relocate construction aids as required by the progress of construction, by storage requirements, and to accommodate requirements of the Owner and other Contractors employed at the site.

**3.03 REMOVAL**

- A. Completely remove temporary materials, equipment, and services:
  - 1. When construction needs can be met by use of permanent construction.
  - 2. At the completion of the Project.
- B. Clean and repair damage to the permanent facilities caused by installation or by use of temporary facilities.
- C. Restore existing facilities used for temporary purposes to specified or original condition.

**END OF SECTION 01520**



**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Safety is the responsibility of each individual Contractor. Each Contractor shall comply with all local safety ordinances and MIOSHA regulations and requirements while performing the Work.
- B. Each Contractor is required to submit Safety Data Sheets (SDS) to the Construction Manager via Procore or email, to be used for reference only, prior to transporting the material/chemical on site. In addition, it is the responsibility of each Contractor to maintain an accessible SDS file for their employees, subcontractors, sub-subcontractors, and suppliers that are on site.
- C. Each Contractor shall submit evidence of an Employer Safety Program that complies with current MIOSHA regulations and requirements prior to beginning any contract Work.
- D. Each Contractor and their Subcontractor(s), Sub-subcontractor(s), and Suppliers shall take all necessary precautions to ensure the safety of the public and/or workers on the job, and to prevent accidents or injury to any persons, on, about, or adjacent to the premises where the Work is being performed. The Contractor and their Subcontractor(s), Sub-subcontractor(s), and Supplier(s) shall comply with Federal or State OSHA regulations and all other laws, codes, ordinances, and regulations relative to safety and the prevention of accidents.
- E. The Contractor shall designate a responsible representative at the jobsite as Safety Representative who shall be responsible for the promotion of safety and prevention of accidents, and shall enforce all applicable laws, ordinances, codes, rules, regulations, and standards pertaining to safety and prevention of accidents.

**END OF SECTION 01530**

**PART 1 – GENERAL**

**1.01 SECURITY**

- A. Each Contractor shall bear full responsibility for protecting equipment, materials, and tools from damage, loss and vandalism.

**END OF SECTION 01540**

**PART 1 – GENERAL**

**1.01 PROJECT ACCESS**

- A. All employees of the Contractor(s), employees of the subcontractor(s) of the Contractor, any and all other persons having any related activity to the Contractor including suppliers & sales representatives, Inspectors, Architect/Engineer Representatives and all other Visitors must report to the Construction Manager Field Supervisor in the CM Site Office before being permitted into the project.
- B. Each worker must register at the site office prior to entering the work area each day that worker is engaged in the required tasks for the construction of the project. The worker shall register by signing their name and issued ID number, identify the company they represent. The supervising foreman for each Contractor shall be responsible for registering all employees or tier subcontractor employees of that Contractor each day and providing that registration to the CM Field Supervisor.
- C. If Owner requested, all workers will be issued a photo identification badge and corresponding number by the Construction Manager allowing them access to the project. The ID badge shall be worn at all times. Any person failing to wear the photo ID badge will be required to leave the project immediately.
- D. Only workers performing required tasks for the construction of the project will be permitted access to the project site. Workers not actively engaged in performing required tasks will not be permitted on the project.
- E. Suppliers, sales representatives and any other person having legitimate business with the Contractor or a subcontractor of any tier to the Contractor must remain at the Site Office until the on-site supervisor for that Contractor or tier subcontractor meets with that person at the CM Site Office.
- F. Any visitor to the project must register at the CM Site Office, request permission from the CM Site Supervisor for access to the project, have their own personal protection equipment as required by the CM Site Supervisor, and be issued a "Visitor" identification badge allowing access to the project.
- G. The CM Site Supervisor may deny any person access to the project for any reason the supervisor may see fit.
- H. The Contractor agrees to adhere to this Project Access policy regardless of all other agreements.

**1.02 ACCESS ROADS**

- A. Contractors' access to the Project site and arrangements for periodic, temporary access for specific construction shall be made through the Construction Manager with the Owner's approval.

**1.03 DELIVERY**

- A. Contractors receiving deliveries to site shall request a 24-hour notice to delivery from suppliers. Contractors receiving deliveries shall ensure that their personnel are at the site to receive deliveries, and properly store them.
- B. Bidders of Divisions for supply only shall give 48 hours' notice to the Field Construction Manager so proper arrangements can be made for unloading.
- C. Any Contractors or Bid Division suppliers not giving notice shall reimburse Contractors at the site or be back charged accordingly for unloading and storage of said materials.
- D. Since site space is limited, delivery of materials shall not be made to the jobsite before progress of the job schedule calls for it, unless approved by the Construction Manager.

**1.04 PARKING**

- A. Contractor parking will be in an area designated by the Construction Manager on site.

**1.05 SITE PLAN**

- A. Refer to the Contractors use of premises (Section 01010) for further information on the use of the site.

**END OF SECTION 01550**

**PART 1 – GENERAL**

**1.01 CONTROLS**

- A. Control of elements such as noise, dust, water, pests, rodents, debris, pollution, and erosion are the responsibility of the Contractor(s). The Architect and Construction Manager will identify the Contractor(s) responsible for these controls in the event such controls have not been implemented. The Contractor(s) agree to abide by the assignment of responsibility by the Architect and Construction Manager regarding such controls when required. The Contractor(s) shall be responsible for performing the control measures in strict conformance to all governing codes and restrictions.

**END OF SECTION 01560**

**PART 1 – GENERAL**

**1.01 TRAFFIC REGULATIONS**

- A. Contractors shall abide by all governmental and Owner-established traffic regulations.
- B. Contractors shall use the route designated by the Owner/Construction Manager and shall comply with the requirements of Section 01550 – Access and Deliveries.

**END OF SECTION 01570**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. No signs shall be displayed by any Contractor.

**END OF SECTION 01580**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Project Field Office will be located on-site adjacent to the location of the temporary power.
- B. The Project Field Office will be used by the Owner, Construction Manager, and Architect.
- C. Project meetings and progress meetings will be held in the Project Field Office, or at another location selected by the Construction Manager when deemed necessary.

**1.02 TRAILERS, ETC.**

- A. Trailers to be used as Contractors' site office and storage will be permitted. Approval must be obtained from the Field Construction Manager prior to moving on-site and will be located as directed by the Construction Manager. All trailers must meet federal, state, and local electrical and fire codes.

**END OF SECTION 01590**



**PART 1 – GENERAL**

**1.01 NEW MATERIAL AND EQUIPMENT**

- A. Material and equipment incorporated into the Work shall:
1. Conform to applicable specification and standards,
  2. Comply with sizes, makes, types, and qualities specified or as specifically approved in writing by the Architect or Owner.
- B. Manufactured and Fabricated Products:
1. Design, fabricate and assemble in accord with the best engineering and shop practices.
  2. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
  3. Two or more items of the same kind shall be identical, by the same manufacturer.
  4. Products shall be suitable for service conditions.
  5. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to, unless variations are specifically approved in writing by the Project Architect.
- C. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

**1.02 MANUFACTURERS INSTRUCTIONS**

- A. When the Contract Documents require that installation comply with manufacturers' printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two (2) copies to the Project Architect.
- B. Maintain one set of complete instructions at the site during installation, until project completion.
- C. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
1. Should job conditions or specified requirements conflict with manufacturers' instructions, consult with the Project Team for further instructions.
- D. Perform Work in accord with manufacturers' instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

**1.03 TRANSPORTATION AND HANDLING**

- A. Arrange deliveries of products in accord with the Short Term Construction Activities Plan. Coordinate to avoid conflict with Work and conditions at the site.
1. Deliver products in undamaged condition, in manufacturers' original containers or packaging, and with identifying labels intact and legible.
  2. Immediately upon delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and approved submittals, and to ensure that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods, which will prevent soiling or damage to products or packaging.

**1.04 STORAGE AND PROTECTION**

- A. Store products in accord with manufacturers' instructions, with seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weather tight enclosures.
  - 2. Maintain temperature and humidity within the ranges required by Manufacturers' instructions.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that the products are maintained under specific conditions and are free from damage or deterioration.
- C. Protection after Installation:
  - 1. Provide substantial coverings as necessary to protect installed products from damage, traffic, and subsequent construction operations. Remove the coverings when they are no longer needed.

**1.05 SUBSTITUTIONS AND PRODUCT OPTIONS**

- A. Products List:
  - 1. Before commencing Work, submit to the Construction Manager a complete list of major products proposed to be used, with manufacturers' and suppliers' names, product names, model numbers, and where applicable, names of installing subcontractors. (Refer to Section 00680.)
- B. Contractor's Options:
  - 1. For products specified only by reference standard, select any product meeting that standard.
  - 2. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named, which complies with the specifications.
  - 3. For products specified by naming one or more products or manufacturer and "or equal," Contractors must submit requests for substitutions for any product or manufacturer not specifically names.
  - 4. For products specified by naming only one product and manufacturer, there is no option.
- C. Substitutions:
  - 1. The Project Team will consider written requests from Contractors for substitution of products.
  - 2. Submit a separate request for each product, supported with complete data, with drawings and samples, as appropriate, including:
    - a. Comparison of the qualities of the proposed substitution with that specified,
    - b. Changes required in other elements of the Work because of the substitution,
    - c. Effect on the construction schedule,
    - d. Cost data comparing the proposed substitution with the product specified,
    - e. Any required license fees or royalties,
    - f. Availability of maintenance service, and source of replacement materials.
  - 3. Architect will be the judge of the acceptability of all proposed substitutions.
  - 4. Any request for a substitution constitutes a representation that the Contractor:
    - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified,
    - b. Will provide the same warranties or bonds for the substitution as for the product specified,
    - c. Will coordinate the installation of accepted substitutions into the Work, and make such other Changes as may be required to make the Work complete in all respects,
    - d. Waivers all claims for additional costs which may subsequently become apparent.
  - 5. The Construction Manager will review requests for substitutions and the Architect's determination of acceptability with reasonable promptness and will notify Contractors in writing of his decisions regarding requested substitutions.

**END OF SECTION 01600**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Each Contractor shall comply with requirements stated in the General Conditions and in the Specifications for procedures in closing out the Work.

**1.02 SUBSTANTIAL COMPLETION AND FINAL INSPECTION PROCEDURE**

- A. When a Contractor's work is 98% complete, and in compliance with Section 10 "Completion" of the Contract, the Contractor will be provided with a Certificate of Substantial Completion, after proper certification by the Construction Manager and Architect. A list of Work in need of correction and a list of incomplete Work will be forwarded to the Contractor. Both the Construction Manager and the Architect will have input to each list.
- B. Each Contractor will be allowed two weeks to complete the items on both lists beginning from the date stipulated on the Certification of Substantial Completion. The Contractor shall begin completion and correction activities within seven (7) days of receipt of the lists and complete all activities within the two weeks period specified. Contractors failing to perform in accord with these time parameters will be subject to the provisions of the Additional Conditions, and the Owner will have the right to carry out the corrective Work and/or complete the Work. The cost of correction or completion will be deducted from the Contractor's contract amount.
- C. By the act of submitting the Certificate of Substantial Completion for execution by the Construction Manager and the Architect, the Contractor represents that they have:
1. Reviewed the Contract Documents.
  2. Inspected their Work for compliance with the Contract Documents.
  3. Completed their Work in accord with the Contract Documents and all pertinent submittals.
- D. They further represent that:
1. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  2. Their Work is completed and ready for final inspection.

**1.03 CONTRACTOR'S CLOSEOUT DOCUMENTS**

- A. Upon Substantial Completion, the Contractor shall submit the following:
1. Evidence of compliance with requirements of governing authorities, including Certificates of Inspection.
  2. Operating and Maintenance Data, Product Data and Instructions to the Owner's personnel.
  3. Warranties and Bonds
  4. Spare Parts and Maintenance Materials
  5. Evidence of Payment and Release of Liens
  6. Certification of Substantial Completion.
  7. As Built Drawings
  8. Contractor Hazardous Materials Compliance Affidavit
  9. Asbestos Free Affidavit
  10. Letter from Contractor's Insurance carrier that a Certificate of Insurance shall be sent to the Construction Manager at renewal time for a two (2) year period after substantial completion.
- B. One (1) hard copy set along with one (1) electronic set of close out documents shall be submitted to the Construction Manager upon Substantial Completion.

- C. All Close Out documents must be turned in within two weeks of substantial completion. Final payment to the contractor will not be released until all close out documents have been received and approved and/or punch list items have been completed and signed off.

**1.04 FINAL APPLICATION FOR PAYMENT**

- A. Each Contractor shall submit the final Application for Payment in accord with the procedures and requirements stated in the General Conditions of the Contract for Construction.
- B. Refer to Sections 01720, 01730, and 01740 for further information regarding submittals.

**END OF SECTION 01700**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Each Contractor shall execute cleaning during the progress of the Work, and at completion of the Work, as required by the Additional Conditions and the Specifications.

**1.02 DISPOSAL REQUIREMENTS**

- A. Conduct cleaning and disposal operation to comply with codes, ordinances, regulations, and anti-pollution law.

**PART 2 – PRODUCTS AND EQUIPMENT**

**2.01 MATERIALS**

- A. Use only those cleaning materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by the manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.
- D. Each Contractor shall provide his/her own cleaning equipment.
- E. Each Contractor shall cooperate with the Owner and the Construction Manager regarding clean up.

**PART 3 – EXECUTION**

**3.01 HOUSEKEEPING AND CLEAN-UP**

- A. Each Contractor shall execute daily housekeeping to keep their Work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris resulting from construction operations.
- B. Each Contractor is financially responsible for his/her clean-up operations. Clean up must be timely as well as thorough in order to meet safety regulations and permit other Contractors to perform without hindrance from dirt and debris. The Construction Manager will coordinate Project housekeeping and take appropriate steps to maintain clean, safe working conditions. **Contractors failing to meet housekeeping requirements will be charged for services arranged by the Construction Manager.**

**3.02 DUST CONTROL**

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly coated surfaces.
- C. Clean up must be performed after each task is done.
- D. Each Contractor is responsible for developing a plan for dust control and debris removal for each task prior to starting.

**3.03 FINAL CLEANING**

- A. Each Contractor shall employ qualified persons for cleaning.
- B. Installing Contractors shall remove grease, mastic adhesives, dust, dirt, stains, finger-paints, labels, and other foreign materials from exposed interior and exterior surfaces, for acceptance by the Construction Manager, prior to leaving the site.
- C. Prior to final completion or Owner occupancy, each Contractor shall conduct an inspection of exposed interior and exterior surfaces and all work areas, to verify that the entire Project is clean.

**END OF SECTION 01710**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Construction Manager will make available a set of Record Documents of the following:
1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other Modifications to the Contracts.
  5. Written Instructions.
  6. Approved Shop Drawings, Product Data and Samples.
  7. Field Test Records.
  8. Construction Photographs.

**1.02 RECORD DRAWINGS**

- A. As a condition of final payment, each Contractor shall mark any and all installation information that differs in location, size, dimension or type from that shown on the Construction Documents on a single set of Construction Documents. Location of items of work such as electrical conduits, junction boxes, fire alarm cable, data cable, etc., that are not specifically shown on the Construction Documents shall be included in the Record Drawings. Locations of all work installed under concrete slabs shall be noted with accurate dimensions and the depth below finish floor indicated.

**1.03 SUBMITTAL**

- A. At Contract Closeout, each Contractor shall deliver one (1) hard set along with (1) electronic set of Record Documents, as indicated in 01700.1.03B to the Construction Manager, for delivery to the Owner.
- B. Each Contractor shall accompany their Record Document submittal with a transmittal letter in duplicate, containing:
1. Date.
  2. Project and Phase designation.
  3. Contractor's name and address.
  4. Bid Division name and number
  5. Title and number of each Record Document.
  6. Signature of Contractor of his authorized representative.
- D. The receipt of such Record Documents by the Construction Manager or the Owner shall not be a waiver of any deviations from the Contract Documents.

**END OF SECTION 01720**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Each Contractor shall compile product, data, and related information appropriate to the Owner's maintenance and operation of products furnished under their contract.
- B. Each Contractor shall instruct the Owner's personnel in the maintenance of products and in the operation of equipment and systems.

**1.02 MAINTENANCE AND OPERATING MANUALS**

- A. Prior to Substantial Completion, each Contractor shall submit to the Construction Manager one (1) hard set along with one (1) electronic set of all comprehensive maintenance and operating materials, presenting complete directions and recommendations for the proper care and maintenance of all visible surfaces, as well as maintenance and operating instructions for all equipment items which the Contractor has provided or installed.
- B. Operating instructions shall include all necessary printed directions for correct operation, adjustment, servicing, and maintenance of movable parts. Also included shall be suitable parts lists and diagrams showing parts location and assembly.

**1.03 INSTRUCTION OF OWNER'S PERSONNEL**

- A. Prior to final inspection or acceptance, each Contractor shall fully instruct the Owner's designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems.
- B. Manufacturer's operating and maintenance manuals shall constitute the basis of instruction. Each Contractor shall review the contents of such manuals with the Owner's personnel in full detail to explain all aspects of operation and maintenance.

**END OF SECTION 01730**



**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. The Contractor shall provide a written Guarantee for all labor, material, equipment and workmanship for a minimum period of two (2) years from the date of Substantial Completion of the project (or longer period of time if stipulated in the specifications) covering the work of their entire Bid Division(s).
- B. The Contractor shall also provide a written Warranty covering all work of their entire Bid Division(s) for a minimum period of two (2) years from the date of final project completion (or longer period of time if stipulated in the specifications).
- C. The Contractor shall further provide all supplier, manufacturer, subcontractor and other written guaranties and warranties covering the work of the entire Bid Division(s) as required by the project specifications.

**1.02 REQUIREMENTS**

- A. The Contractor shall provide one (1) hard copy along with one (1) electronic copy of all written Guaranties and Warranties.
- B. The Contractor shall review all guaranties and warranties to assure of their compliance with all conditions of the contract.
- C. The Contractor shall assemble all guaranties and warranties, fully executed by each respective contractor, supplier, manufacturer and subcontractor and submit to the construction manager within two weeks of the date of Substantial Completion of the project.
- D. If the Owner elects to permit equipment and component parts of equipment into service during the progress of construction and has issues such permission in writing, all such guaranties and warranties must be submitted to the construction manager within two weeks after inspection and acceptance.
- E. For items of work where acceptance is delayed materially beyond the Date of Substantial Completion, the Contractor shall provide revised guaranties and warranties listing the acceptance date as the start of the guaranty or warranty period.

**END OF SECTION 01740**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. It shall be the Contractor’s responsibility to ensure that the Owner is notified of any hazardous materials brought to the site.
- B. In compliance with Michigan State Law there is to be no smoking anywhere on the project site or owner’s property or use of any tobacco product at any time.
- C. The Contractor agrees to disallow any known carcinogens to be brought onto the jobsite at any time.
- D. The Contractor will not permit any employee to be in possession of any firearm or ammunition when on school property either on the worker’s person or in the worker’s vehicle. It is illegal to possess firearms or ammunition on your person or in a vehicle on school property at any time.

**1.02 REQUIREMENTS**

- A. The Contractor shall provide:
  - 1. One (1) hard copy of each Safety Data Sheet (SDS) for each of the hazardous materials used on the site.
  - 2. Certification that the Contractor (and their subcontractors) has instructed the persons using the hazardous materials in their proper use.
  - 3. For removal of any unused hazardous materials in their proper use.
  - 4. Certification that no asbestos containing materials are being used or brought onto the site by signing and notarizing the asbestos free certificate, which follows as page 3 of this Section.
- B. The Contractor shall utilize employee(s) that have been trained and certified for Hazardous Material Awareness specifically for asbestos and lead awareness.
- C. The Contractor has the responsibility to make themselves, their employees, and their subcontractors aware of any hazardous materials in the area of their specified work.
- D. The above requirements must be fulfilled, in writing, at or prior to a pre-construction meeting by filling out the Contractor Hazardous Materials Compliance Form, which is page 2 of this section.
- E. Standard safety practices and regulations as supplied by all governmental agencies will be in effect.
- F. A list of district SDS sheets is available on request.
- G. The Contractor shall submit a completed Contractor Hazardous Materials Compliance Affidavit and Asbestos-Free Affidavit certifying that no hazardous material has been incorporated into the Project as part of the documentation for Contract Close-Out.

**2.01 COMPLIANCE**

- A. Compliance with EPA AHERA for Asbestos.
  - 1. The Contractor must adhere to all EPA AHERA and Michigan State Asbestos Regulations for asbestos and other hazardous materials.

B. Compliance with Lead-Containing Materials.

1. All Contractors, Subcontractors and Sub-subcontractors shall adhere to the Environmental Protection Agency (EPA) lead-based paint regulation titled the "Renovation, Repair and Painting (RRP) Rule". Included under this law are "Child Occupied Facilities" (COFs). COFs encompass locations of a pre-1978 constructed buildings where children under age of six (6) regularly visit, such as kindergarten rooms, 1st grade classrooms, applicable restrooms, preschools and day care centers. Therefore portions of each pre-1978 constructed school building falls under the RRP Rule.
2. Any contractor working on this project who disturbs painted surfaces in COF spaces shall ensure that they adhere to all aspects of the RRP Rule. This includes but is not limited to meeting the requirements for being a Certified Firm, having a Certified Lead Renovator involved and following applicable lead safe work practices.
3. Furthermore, all Contractors shall be responsible to comply with all applicable Federal and Michigan State lead regulations including, but not limited to, 29 CFR Part 1926.62 of the OSHA Lead Construction Standard, (Part 603 of the Michigan State Standards). All costs associated with regulatory compliance shall be borne by the Contractor.

**CONTRACTOR HAZARDOUS MATERIALS COMPLIANCE AFFIDAVIT**

PROJECT NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

Contractor: \_\_\_\_\_

Address: \_\_\_\_\_

Contractor's Representative: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Job Location: \_\_\_\_\_

This document certifies that the Contractor and any subsequent Contractors have complied with the terms set forth in the requirements for **Oscoda Area Schools 2024 Bond Program** as they pertain to hazardous materials.

The SDS's are attached for all hazardous materials which will be brought to **Oscoda Area Schools New Community Center**.

There are \_\_\_\_\_ SDS's attached.

The Contractor's employees (including subcontractors) have received appropriate instructions pertaining to the use and handling of hazardous materials.

The Contractor has been informed of hazardous materials in the area of the specified work.

\_\_\_\_\_  
Signature of Contractor's Representative

Date: \_\_\_\_\_

Received by: \_\_\_\_\_

Date: \_\_\_\_\_

**ASBESTOS FREE AFFIDAVIT**

Contractor: \_\_\_\_\_

Company Name: \_\_\_\_\_

Street: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Project: \_\_\_\_\_

Bid Division: \_\_\_\_\_

Name of Building(s) in which work was performed:

\_\_\_\_\_  
\_\_\_\_\_

Certificate Statement:

I \_\_\_\_\_, representing and having authority for

\_\_\_\_\_, hereby certify that any and all products/materials

that will be or have been installed/introduced in the above mentioned buildings, are asbestos free or less

that one percent (1%) asbestos by weight.

Name (printed): \_\_\_\_\_ Position: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Notary Public: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**END OF SECTION 01800**

**PART 1 – GENERAL**

**1.01 NOTICE**

- A. This notice is to formally advise you, per AHERA Requirements, that all buildings may have asbestos containing materials present. All areas testing positive for asbestos are documented in booklets located in the **Oscoda Area Schools 2024 Bond Program**.

**1.02 DESCRIPTION**

- A. All thermal insulation such as pipe wrap, especially joints, should be assumed to contain asbestos. Contractors are cautioned not to attempt removal of these materials without first notifying the Owner.

# AHERA Notification and Contractor Compliance Affidavit

**Project Name:** Oscoda Area Schools 2024 Bond Program – Community Center Rebid - General Trades, Roofing, Flooring & Fire Protection  
**Project #:** A24908  
**Owner:** Oscoda Area Schools  
**Address:** 3550 E. River Road, Oscoda, MI 48750

**This notice is to formally advise you, per AHERA Requirements, that all buildings may have existing asbestos containing materials. All areas testing positive for asbestos have been documented in the owner’s asbestos inspection report available for inspection at the owner’s main office. All areas currently testing positive for asbestos are documented in the attached Three-Year Re-Inspection Asbestos plan report that has been provided by: Oscoda Area Schools.**

**All thermal insulation such as pipe wrap, especially joints, should be assumed to contain asbestos. Contractors are cautioned not to attempt removal of these materials without first notifying the Owner.**

**I / We \_\_\_\_\_ doing business as \_\_\_\_\_ acknowledge receipt of the Three Year Re-Inspection Asbestos plan for the above mentioned project(s) as provided by Oscoda Area Schools and certify that all employees of this contractor shall have been trained in the MIOSHA Two-Hour Asbestos Awareness program. It is this Contractor’s responsibility to inform any subcontractors or suppliers of this information and assume all responsibility for such notification.**

\_\_\_\_\_  
Company

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip

State of \_\_\_\_\_ County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_

day of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

\_\_\_\_\_  
Seal

**END OF SECTION 01805**

**PART 1 – GENERAL**

**1.01 CODES**

- A. All work shall comply with the applicable requirements of the local building code and accident and fire prevention regulations.

**1.02 SCOPE**

- A. The Work covered by this section of Specifications includes, but is not limited to, the following:
1. Demolish and remove existing materials as shown on the plan and noted in the Description of Work.
  2. Cover holes and other hazardous openings with approved materials and barriers.
  3. Remove all demolition materials and debris from the construction site and dispose of in a legal manner.
  4. Protect adequately the construction site, adjoining property, and utility services as work proceeds through all stages.

**1.03 QUALITY ASSURANCE**

- A. Contractor's staff responsible for demolition shall be experienced in this type of work. Equipment is to be of suitable type, in good working condition, and operated by skilled mechanics.

**PART 2 – PRODUCTS**

**2.01 TEMPORARY ENCLOSURES**

- A. Provide temporary enclosures to prevent dust from entering other parts of the facility during demolition. Furnish, install and remove when directed, temporary weathertight enclosures in all exterior openings created during demolition by the contractor.

**PART 3 – EXECUTION**

**3.01 GENERAL INSTRUCTIONS**

- A. All work shall be done in a safe and cautious manner in order to avoid accidents and property damage.
- B. Protect the work scheduled to remain, and if damaged, repair to match existing work.
- C. All salvaged material unless otherwise noted on plans or in the Description of Work shall become the property of the Contractor and shall be evaluated in the Contractor's bid price. Promptly remove salvaged material from the construction site as the work proceeds.
- D. Carefully dismantle and store on site all material scheduled to remain the Property of the Owner. Protect until removed by the Owner or until end of Contract.
- E. Protect from damage and clean materials scheduled to be reused.
- F. Protect parts of the existing Work scheduled to remain. Cut away carefully the parts to be demolished to reduce the amount of necessary repairs.
- G. Support existing structure as needed during cutting of new openings or replacement of structural members.
- H. Prevent accumulation of debris and overloading of any part of the structure.
- I. Prevent access of unauthorized persons to partly demolished areas.
- J. Remove all demolition materials, debris, and rubbish from the site as soon as practicable. Do not permit any accumulation on the site. Transport all demolition materials without spillage on the streets.

**END OF SECTION 001900**



New Community Center  
For:  
**Oscoda Area Schools**  
Oscoda, MI

**Specifications**

Issued For:  
**Bidding/Permit**  
**12/20/2024**

Prepared by:

**THE COLLABORATIVE**

One SeaGate, Park Level 118  
Toledo, Ohio 43604  
Phone: 419-242-7405  
Fax: 419-242-7400

Project No. 107253



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260526 .....Grounding and Bonding for Electrical Systems .....5  
260529 .....Hangers and Supports for Electrical Systems .....4  
260533.13 .....Conduit for Electrical Systems .....10  
260533.16 .....Boxes for Electrical Systems .....5  
260553 .....Identification for Electrical Systems .....5  
260923 .....Lighting Control Devices .....6  
262413 .....Switchboards .....4  
262416 .....Panelboards .....4  
262726 .....Wiring Devices .....6  
262816.16 .....Enclosed Switches .....3  
264300 .....Surge Protective Devices.....2  
265100 .....Interior Lighting .....5  
265600 .....Exterior Lighting .....4

**DIVISION 27 – COMMUNICATIONS**

270529 .....Hangers and Supports for Communications Systems .....4  
270533.13 .....Conduit for Communications Systems .....7  
275116 .....Public Address Systems .....3

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

281000 .....Access Control .....4  
282000 .....Video Surveillance .....5  
284600 .....Fire Detection and Alarm .....6

**DIVISION 31 – EARTHWORK**

312000 .....Earthwork .....4

**DIVISION 32 – EXTERIOR IMPROVEMENTS**

321217 .....Hot Mixed Asphalt Paving – Superpave Mixtures .....8  
321313 .....Concrete Paving .....4  
321314 .....Concrete Sidewalk, Sidewalk Ramps and Driveways.....6  
321613 .....Concrete Curbs and Gutters .....3

**DIVISION 33 – UTILITIES**

331100 .....Water Mains .....14  
333100 .....Sanitary Sewers .....9  
334100 .....Storm Sewers .....5

**END OF DOCUMENT**

**SECTION 003100 - AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.1 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders, as follows:
- B. Geotechnical Report, dated September 23, 2024.
  - 1. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**







**DRIESENGA &  
ASSOCIATES, INC.**

**Engineering · Surveying · Testing**

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[www.driesenga.com](http://www.driesenga.com)

September 23, 2024

*via electronic mail*

Mr. Nate Torrey  
FLEIS & VANDENBRINK  
2960 Lucerne Drive SE, Grand Rapids, MI 49546

**Re: Geotechnical Report  
Oscoda Area Schools Community Center Building  
3550 East River Road, Oscoda, MI 48750  
Driesenga & Associates, Inc. Project No. 2440779.3A**

Dear Mr. Torrey:

Driesenga & Associates, Inc. is pleased to submit the attached report of subsurface exploration performed for the above-referenced project. The report presents the exploration procedures, subsurface conditions encountered, and our recommendations for development of the site with respect to proposed earthwork, foundation construction, and pavement design. As the project nears construction you can contact Beni Traore at 517-505-0220 in our local office to provide a quote for construction materials testing and survey needs.

Proper execution of our recommendations will affect the design, construction and performance of the structure and related facilities, and the potential associated risks involved. Therefore, the issues and recommendations presented in this report should be discussed with the project team, including Driesenga & Associates, Inc. This will increase the likelihood that the issues are understood and our recommendations are applied in a manner consistent with the project budget, tolerance of risk, and expectations for performance and maintenance.

We appreciate the opportunity to be of service to you. If you have any questions concerning this report, or if we can be of further service as design and construction progresses, please contact our office.

Sincerely,  
**DRIESENGA & ASSOCIATES, INC.**

Michael Stork  
Senior Project Geologist

Musana Nabil  
Senior Project Engineer

Randy Pail, P.E.  
Director of Geotechnical Engineering

# **GEOTECHNICAL REPORT**

## **SITE:**

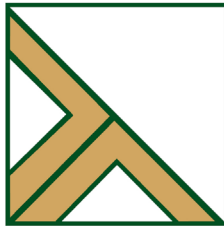
**OSCODA AREA SCHOOLS  
COMMUNITY CENTER BUILDING  
3550 EAST RIVER ROAD  
OSCODA, MI 48750**

**SEPTEMBER 23, 2024  
PROJECT NO. 2440779.3A**

## **PREPARED FOR:**

**FLEIS & VANDENBRINK  
2960 LUCERNE DRIVE SE  
GRAND RAPIDS, MI 49546**

Prepared by:



**DRIESENKA &  
ASSOCIATES, INC.**

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**Engineering · Surveying · Testing**



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### APPENDICES

APPENDIX A	Figure 1 – Site Location
	Figure 2 – Boring Locations
APPENDIX B	Soil Boring Logs
APPENDIX C	Field and Laboratory Procedures



## 1.0 INTRODUCTION

### 1.1 LOCATION

This report presents the results of the geotechnical investigation completed for the proposed Oscoda Area Schools Community Center Building. The site is located at 3550 East River Road IN Oscoda, Michigan as shown on Figure 1 – Site Location (Appendix A).

### 1.2 PURPOSE

The purpose of this investigation was to determine the subsurface profile, the engineering characteristics of the subsurface soils, and to provide recommendations in regard to the proposed design and construction based on our interpretation of the test results. This report was prepared in general accordance with our proposal dated August 8, 2024 and F&V MSA dated August 22, 2024, as authorized by Mr. Brian Sinnott of Fleis & Vandenbrink Engineering, Inc. on August 22, 2024.

### 1.3 SCOPE

The field exploration to estimate engineering characteristics of the site soils included performing a site reconnaissance, advancing the soil borings, performing standard penetration tests, and recovering split-spoon samples. Soil boring locations were determined in the field by measuring from existing site features. Existing ground surface elevations were not provided and obtaining them was beyond the scope of this investigation.

Three (3) soil borings, designated SB-1 to SB-3, were advanced in the vicinity of the proposed building on September 9, 2024, at the approximate locations shown on Figure 2 - Boring Locations (Appendix A). The soil borings were advanced with hollow-stem augers to depths ranging between thirty-five (35) to fifty (50) feet below the ground surface. During drilling, soil samples were collected from split-spoon sampling via standard penetration testing (ASTM method D 1586)



at intervals of 2.5 feet to a depth of 10 feet, and intervals of 5 feet from a depth of 10 feet to the end of each boring. The soil boring logs are contained in Appendix B. The field and laboratory procedures are described in Appendix C.

#### 1.4 DESIGN INFORMATION

The proposed building will be a single-story structure, measuring approximately 30,000 square feet, and will be utilized as a gymnasium building with offices, restrooms, locker rooms. The finished floor elevation will be at 619 feet. The new construction will also include a new parking area to the west of the new gymnasium.

Structural load information was provided by The Collaborative on an undated Site Plan titled “2024 Bond Project / Oscoda Area Schools”. For calculation purposes, maximum loads of 4,900 pounds per lineal foot of wall and 75 kips per column were provided. Assuming that the new construction will not include any basement areas, exterior footing depths are assumed to be a minimum of 3.5 feet below the final ground surface elevation.

We have assumed maximum tolerable settlements of 1 inch total and ½ inch differential. We anticipate cuts and fills on the order of 2 feet or less will be required to establish site grades. Any significant deviation from these assumptions should be brought to the attention of Driesenga & Associates, Inc. as soon as possible.



## 2.0 SITE CONDITIONS

### 2.1 GENERAL

The stratification of the soils, as shown on the soil boring logs in Appendix B, represents the soil conditions at the actual soil boring locations. Variations may occur away from or between the soil borings. Stratigraphic lines shown on the soil boring logs represent the approximate boundary between the soil types, but the transition may be gradual. They are not intended to show exact depths of change from one soil type to another. In addition, changes in soil type may occur between the sample intervals that are consequently not observed by the driller.

The soil boring logs in Appendix B include the drilling method, materials encountered, penetration resistances, and pertinent field observations made during the drilling operations along with the results of the laboratory testing.

### 2.2 SURFACE CONDITIONS

The area of the proposed building is currently maintained lawn and gravel area. This area is relatively flat with little to no apparent sloping. The existing building is surrounded by structures, maintained lawn, asphalt parking, and driveway areas associated with residential and school uses.

### 2.3 DESCRIPTION OF SUBSURFACE SOILS

Soils/Surface materials encountered at the site generally consist of 5 inches of topsoil at soil boring location SB-1, and 1 inch of sand gravel at soil boring location SB-3. Fill soils were encountered at soil boring location SB-1 beneath the topsoil and extended to approximately 3.5 feet below the ground surface. Beneath the surface materials at SB-1 and SB-3 and from the surface at SB-2, native soils consisting of loose to very dense brown sands were encountered to the explored depth of the soil borings. The estimated group symbol, according to the USCS, is shown in the USCS



column just before the textural description of the various strata on the soil boring logs in Appendix B.

## 2.4 GROUNDWATER OBSERVATIONS

Groundwater was initially encountered at depth of 13 feet below the existing ground surface in all of the soil borings. Hydrostatic groundwater levels and the elevations and volumes of groundwater should be expected to fluctuate throughout the year, based on variations in precipitation, evaporation, run-off, and other factors. The groundwater levels indicated by the soil borings and presented in this section represent conditions at the time the readings were taken. The actual groundwater levels at the time of construction may vary.

Groundwater measurements were collected during drilling and attempted shortly after completion of the drilling operations. After drilling and collection of groundwater readings, the boreholes were backfilled with auger cuttings and the surface was repaired approximating previous conditions. Since the boreholes were backfilled shortly after drilling, long-term groundwater level information is not available from the soil borings. To obtain long-term groundwater levels, groundwater observation wells would be required.

## 2.5 SEISMIC SITE CLASS

The proposed building's seismic class was determined for use in the structural design of the proposed project. Soils information was obtained from the soil borings completed on-site, as well as information obtained from the "Soil Survey of Iosco County" by the United States Department of Agriculture, the "Quaternary Geology of Michigan" completed by W.R. Farrand, the USGS Topographic Quadrangle and the Hydrogeologic Atlas of Michigan. It is assumed that the proposed structure falls under Building Class II according to the 2015 Michigan Building Code (MBC) Table 1604.5. Based on this information it is our determination that seismic site class D be used according to the ASCE 7 – Table 20.3-1 for structural calculations.



## 2.6 LIMITATIONS

Soil and groundwater conditions have been observed and interpreted at the soil boring locations only. This information has been used as the basis for our analyses and the recommendations that follow. Although we have allowed for minor variations in subsurface conditions in the development of our recommendations, conditions can vary away from and between soil boring locations. Should this become evident during construction, we should be contacted to review our recommendations. This geotechnical evaluation and report were prepared for geotechnical purposes only. We did not perform environmental related borings or analytical tests.





### 3.0 RECOMMENDATIONS

#### 3.1 SITE PREPARATION

To increase the likelihood that the recommended allowable soil bearing capacities are achieved and tolerable settlements are not exceeded, the recommendations contained herein should be followed. Within the building footprint and any areas to receive fill, all existing building material, topsoil, old fill, organic-containing material, frozen soil and other unsuitable material should be removed. The clearing should extend a minimum of 5 feet beyond the limits of proposed building and pavement areas and areas to receive structural fill.

It is strongly recommended that the building pad and pavement subgrade areas be evaluated by Driesenga & Associates, Inc. after the area has been cleared and stripped. This evaluation may be performed by proofrolling with a loaded tandem axle dump truck or another method selected by the geotechnical engineer to identify any areas of soft subgrade soil. Where soft subgrade soils are encountered, remedial actions as recommended by the geotechnical engineer will be required.

Existing fill was encountered in several of the soil borings and extended about 1 inch to 3.5 feet below the existing ground surface. Without documentation of the placement of the fill, we consider it to be “uncontrolled fill.” If documentation of the existing fill is available, we would be pleased to review it to determine its suitability of slab, pavement, and/or structural fill support.

Deeper and/or looser uncontrolled fill may be encountered at the site, particularly adjacent to existing or former structures, or in the vicinity of existing utilities. The existing fill *may* be suitable for support of slabs, pavements, and/or structural fill after additional evaluation and special preparation and only where it is not underlain by buried topsoil or other organic, deleterious or otherwise unsuitable soils and the owner accepts the risks in doing so. Existing fill with excessive organics (over 4%), voids or debris should be removed and replaced with structural fill. Test pits should be performed to identify unsuitable fill. The test pits could be performed prior to



construction. However, suitability of the existing fill will need to be determined on a case-by-case basis during construction. The remaining fill, after removing unsuitable fill, is anticipated to be suitable to support floor slabs, pavements and structural fill, provided an increased risk of unsatisfactory performance is acceptable. We believe the risk of unsatisfactory performance such as cracking and settlement associated with the construction of slabs-on-grade and pavements on or above the existing fill is relatively low after preparation.

Ultimately, if the risk of poor slab and/or pavement performance is not acceptable, complete removal of the existing fill and replacement with structural fill should be performed. Based on the soil borings, the existing fill could extend 3.5 feet or more below the existing ground surface. If performed, the removal of the existing fill should extend a minimum of 10 feet beyond the edges of the proposed building, or laterally on a two vertical to one horizontal slope from the bottom outside edge of the foundation, whichever is greater. This action should reduce the amount and depth of undercutting during foundation construction since the unsuitable fill and any unsuitable soils directly beneath fill would be removed. For this case, the test pit evaluation would not be necessary. However, a test pit evaluation could be performed to provide a better estimate of the nature, depth and extent of the existing fill.

In all general fill areas, the exposed granular soil surface should be scarified to a depth of 12 inches and recompact to a minimum of 95% of Modified Proctor maximum dry density (MDD) per ASTM D 1557 method, or 98% of MDD as determined by the Michigan Cone Method. In any areas of backfill below the groundwater elevations, the use of a clean (less than 7% passing the No. 200 sieve), 1-inch to 3-inch open-graded crushed aggregate is recommended. Sand soils were encountered at or near the final subgrade level in some of the soil borings in the proposed building area. Within the proposed building area the native sand should be proof-compacted by at least six (6) passes of a 10-ton vibratory roller.

It is recommended that any fill materials be placed in or near horizontal maximum 8-inch-thick loose lifts and compacted to a minimum of 95% of Modified Proctor MDD, or 98% of Michigan



Cone MDD. If a vibratory roller is used for compaction, the loose lift thickness may be increased to 12 inches. Soils used for structural fill should consist of clean sand meeting SW or SP classification in accordance with USCS criteria.

### 3.2 FOUNDATIONS

Considering the subsurface conditions on this site, the assumed proposed construction and the recommended site preparation activities, it is acceptable for the proposed facility to be supported on conventional spread footings. Footings bearing on newly placed structural fill placed over suitable native soils or directly on the native sand may be designed for a maximum net allowable soil bearing pressure of 2,000 psf. The allowable bearing pressure may be increased by one-third for seismic or wind loads. The footings should not be placed on the existing fill material.

At some locations, the native sand soils may be in relatively loose condition and not suitable for support of foundations at the recommended design soil bearing pressure. In addition, these soils may become loosened below the bottom of footing level from the excavation activities or from construction traffic, especially if allowed to dry out. Therefore, the excavated footing bearing surfaces should be compacted to a minimum of 95% of Modified Proctor MDD, or 98% of MDD as determined by the Michigan Cone Method, just prior to concrete placement. A hand-operated plate compactor may be used for loose or disturbed soil that is less than 6 inches in thickness. For deeper compaction, we recommend using a hoe-pac mounted on a backhoe. Water may need to be added to achieve the desired compaction for the allowable bearing capacity.

If it is not possible to improve the sands by densification, the unsuitable soils may need to be removed and the foundations placed on suitable native soils encountered at lower levels. Alternatively, the undercut may be backfilled with crushed aggregate to the bottom of footing level. In addition, wet or easily disturbed foundation bearing soils could be encountered at some locations. If wet soils are encountered, we recommend a layer of crushed aggregate be placed on the subgrade. The thickness of this layer will depend on the conditions encountered at the time of



construction. In areas where undercutting is required, the undercut should extend laterally on a two vertical to one horizontal slope from the edge of the footing.

All perimeter footings and footings in unheated areas should bear at least 42 inches below finished grade for protection from frost action. To reduce the likelihood of frost heave, trench footings should be formed vertically and should not be allowed to widen near the top. If interior footings are to bear on compacted fill, the fill should be placed in accordance with the recommendations of Section 3.1. Interior foundations can be constructed on suitable natural soils or on structural fill overlying suitable natural subgrade just below the floor slab. However, the footings and proposed bearing soils should be protected from freezing during construction if work is conducted in the cold winter months. Due to the sands encountered at the site, construction of trench footings is probably not feasible. Therefore, we anticipate footing excavations will need to be sloped back and the foundations formed. The placement of footing concrete should be done as soon as footing excavations have been completed and approved to reduce the potential for disturbance or freezing of the footing subgrade.

Prior to concrete placement, the bearing surface should be free of loose soil and standing water. The contractor should avoid stockpiling excavated materials immediately adjacent to the excavation walls. It is recommended that stockpiled materials be kept back from the excavation a minimum distance equal to half the excavation depth to prevent surcharging the excavation walls.

Total and differential settlement of foundations properly designed and constructed based on our recommendations are not expected to exceed 1 inch and ½ inch, respectively.

### 3.3 FLOORS

The soil below the floor slab should be prepared in accordance with the recommendations in Section 3.1. A noncohesive soils mat such as MDOT Class II sand should be provided directly



below the floor slabs. The mat should be a minimum of 8 inches in thickness and compacted to a minimum of 95% of Modified Proctor MDD.

The floor slab should be suitably reinforced and proper joints should be provided at the junctions of the slab and foundation system so that a small amount of independent movement can occur without causing damage. A minimum of 6 inches of structural fill should be provided between the bottom of the slab and the top of the shallow spread footing below. Otherwise, other arrangements should be made to allow for potential relative settlements, such as grade beams, thickened slabs with appropriate reinforcing steel or other appropriate details. A modulus of subgrade reaction of 175 pci should be used in the design of slabs-on-grade.

### 3.4 PAVEMENTS

Specific traffic information was not available in developing these pavement recommendations. For design purposes, we have assumed that passenger vehicles and light trucks will traffic all light/medium duty pavement areas. Heavy duty pavement areas will include entrances, service drives and bus parking areas, and will be trafficked by semi-tractor trailers, buses, refuse trucks, and fire engines. The following Design Inputs were used in our asphalt evaluation:

- Estimated Native Subgrade CBR = 3 to 5 percent
- Design Subgrade Resilient Modulus (MR) = 4,100 to 5,800 psi
- Reliability = 85% flexible
- Standard Deviation = 0.49 flexible
- Initial Serviceability Index = 4.2
- Terminal Serviceability Index = 2.0
- New HMA Layer Coefficient = 0.42
- New Aggregate Base Layer Coefficient = 0.14



The following pavement sections are provided based on subgrade soil conditions and the assumed ESAL design requirement indicated on the tables. The ESAL design values noted below should be confirmed by the design engineers and, if different, D&A should be consulted to revise the provided design section to meet the revised ESAL requirements.

<b>Light to Medium Duty (75,000 ESAL's)</b>					
Layer	Material	Thickness (inches)	Structural Layer Coefficient	Drainage Coefficient	Structural Number
Surface Course	MDOT 13A/4EML or Similar	1.5	0.42	1	0.63
Leveling Course	MDOT 13A/4EML or Similar	1.5	0.42	1	0.63
Aggregate Base	MDOT 21AA (Limestone)	8	0.14	0.75	0.84
Granular Base	Class II	12	0.08	0.75	0.72
<b>Total Structural Number (SN)</b>					<b>2.82</b>

<b>Heavy Duty (250,000 ESAL's)</b>					
Layer	Material	Thickness (inches)	Structural Layer Coefficient	Drainage Coefficient	Structural Number
Surface Course	MDOT 13A/4EML or Similar	2	0.42	1	0.84
Leveling Course	MDOT 13A/4EML or Similar	2	0.42	1	0.84
Aggregate Base	MDOT 21AA (Limestone)	8	0.14	0.75	0.84
Granular Base	MDOT Class II	12	0.08	0.75	0.72
<b>Total Structural Number (SN)</b>					<b>3.24</b>

Compaction of asphalt courses should range between 92% and 96% of the Theoretical Maximum Density (TMD).



The pavement subgrade should be prepared as described in Section 3.1. Above the subgrade, the sand subbase should be constructed in accordance with the tables above using Michigan Department of Transportation (MDOT) Class II Fine Aggregate fill (MDOT Division 3, Section 301 “2012 Standard Specifications for Construction”, April 1, 2011) compacted to a minimum of 95% of the material’s MDD as determined by Modified Proctor.

Pavement underdrains and or perimeter drains should be considered due to the presence of silty sand soils that may hinder drainage and therefore potentially reduce pavement life. Where installed, perimeter underdrains should be placed beneath all pavement edges within the lower portion of the 12 inches sand subbase. Four (4) inch-diameter sock-tube backfilled with at least 6 inches of peastone cover should be used. The drains should flow via gravity to a common low point and into the on-site storm sewer system. In addition, where installed, finger drains should extend radially out from the catch basins and gutter inlets.

The aggregate base for pavement areas should follow MDOT Dense-Graded Aggregate Base Course Materials – Division 3, Section 302 and Division 9, Section 902, using a 21AA (Grading Requirements per MDOT Table 902-1) Limestone Dense-Graded Aggregate material in accordance with the tables above. This gravel base may be placed in one (1) lift and should be compacted to a minimum of 95% of the material’s MDD as determined by Modified Proctor.

Construction traffic should be minimized on the new pavement. If excessive construction traffic is anticipated on the pavement structure, the initial asphalt lift thickness could be increased and placement of the final lift could be delayed until the majority of the construction activities have been completed. This action will allow repair of localized failure, if any does occur, as well as reduce load damage on the pavement system.

A bond coat of emulsion should be used between the base course and wearing course when more than 48 hours have elapsed between placement of the courses, or the surface of the base course has been contaminated by soil or dust. Performance grade asphalt cement should be used in the



production of all bituminous mixtures. Reclaimed Asphalt Pavement (RAP) may be permitted in percentages in accordance with MDOT guidelines and specifications for use in the surface course mix design. We recommend following MDOT Tier 1 or Tier 2 criteria.

After the pavement is complete, we recommend instituting a regular maintenance program that includes sealing of cracks and patching of distressed areas. This should reduce the effect of water infiltration and associated frost action.

In areas where the durability of Portland cement concrete (PCC) is desired over bituminous pavement, a rigid pavement is recommended. A concrete pavement should be constructed on a base layer of at least 6 inches of Michigan Department of Transportation (MDOT) Class II sand subbase (Division 9, Section 902, Grading Requirements per Table 902-3). For light duty applications, the concrete slab should consist of a minimum of 5 inches of 4,000 psi, air entrained concrete (MDOT Division 6, Section 601 – PCC Pavement and Division 9, Section 901 – Cement and Lime). For heavy duty applications, the concrete pavement should consist of a minimum of 6 inches of 4,000 psi, air entrained concrete. Actual design of the slab including reinforcement type and spacing should be performed by the Project Structural Engineer.

These recommendations assume typical conditions during the June through September construction season. Any substitution of materials or deviation from these stated assumptions should be reviewed to assess potential impact on the recommended design.

### 3.5 GROUNDWATER CONTROL

Groundwater problems are not anticipated to be a significant issue during construction. Ideally, the footings should be excavated, formed, and poured on the same day to reduce the potential for rainwater to affect footing subsoils. Any water which enters the footing excavation can likely be controlled by a gravity drain system, sump pump, or other minor dewatering procedure. Concrete should not be placed in footing excavations containing water. Upon removal of any trapped water,





the soils should be reviewed by a soils engineer and any soft areas replaced with structural fill per Section 3.1, as necessary.

Perimeter foundation drains should be installed along foundations where interior finished floor elevations are lower than perimeter grades, or where exterior grades slope toward the building. In addition, all roof drains should be diverted to downspouts which carry water away from foundations and supporting walls.

### 3.6 RETAINING WALLS/SUBSURFACE STRUCTURES

Pressures on basement or retaining walls will depend on the properties of the backfill and yielding of the wall. Assuming imported fill sand meeting the recommendations of Section 3.1 is used as backfill, a soil density of 115 pcf and a coefficient of active pressure ( $K_a$ ) of 0.33 may be used for design in the active condition (i.e., the wall is allowed to move slightly such as a cantilevered retaining wall). An “at rest” coefficient of lateral pressure ( $K_o$ ) of 0.5 should be used if the wall will be fixed or not allowed to move, as in the case of a basement wall. An equivalent fluid pressure of 35 pcf would be appropriate for non-submerged conditions in the active condition and 58 pcf in the “at rest” condition. For the undrained condition, an equivalent fluid earth and groundwater pressure of 95 pcf should be used for the active condition and 120 pcf for the at-rest condition. In no case should cohesive soils be used as backfill against walls, as excessive creep could increase lateral pressures significantly above assumed design values over time.

The coefficient of passive pressure ( $K_p$ ) to resist sliding will depend on the type of soil on the “low side” (i.e., side of the wall opposite the “high side” or backfill). For the native sandy soils and assuming level backfill behind the wall, a  $K_p$  of 3.2 should be used.

Assuming a concrete wall foundation (rough concrete surface), an ultimate friction factor of 0.50 between the concrete and soil should be used to calculate sliding resistance for the native sands or imported sand fill as described in section 3.1. Design calculations should use a minimum factor of



safety of 1.5 to resist sliding (including friction and passive earth pressure forces), and a minimum factor of safety of 1.5 should also be used to resist overturning of the wall.

The recommended earth pressures stated above do not account for surcharge loading on the wall system caused by, for example, stockpiled materials, sloping backfills, or excessive temporary loads. These conditions would increase design pressures and should be properly distributed in the earth pressure analyses. Earth pressures on non-yielding walls can be much higher if backfill is placed with heavy equipment operating immediately behind the wall. To reduce this potential, we recommend that only hand compaction equipment and methods be used for backfilling within 5 feet of the wall.

It is recommended that a perimeter drain be located around the exterior foundation to reduce the buildup of hydrostatic pressure against the walls. The drains must outlet to a positive drain by gravity or to a sump equipped with an automatic properly sized pump. Slotted PVC pipe wrapped in filter fabric and covered with MDOT 6AA or pea stone should be used. Final exterior grades should slope away from below-grade walls to divert surface water.

Waterproofing below-grade walls should also be considered, especially if items housed in the lower level of the building will be sensitive to moisture intrusion (e.g., files, books, and record storage). Waterproofing should consist of water stops at the concrete construction joints. In addition, a waterproofing membrane may be applied to the exterior surface of the below-grade walls to mitigate the potential for water infiltration through the walls.

### 3.7 TEMPORARY EXCAVATION STABILITY

If excavations are anticipated for the proposed structure and/or utilities, shoring and bracing or flattening (laying back) of the slopes may be required to obtain a safe working environment. Excavations should be sloped or shored in accordance with local, state and federal regulations, including OSHA (CFR Part 1926) excavation trench safety standards. We recommend that all



excavated soils be placed away from the edges of the excavation at a distance equaling or exceeding the depth of the excavation. In addition, surface runoff water should be diverted away from the crest of the excavated slopes to prevent erosion and sloughing.

Localized areas of soft or unsuitable soils not detected by our borings or in unexplored areas may be encountered once construction begins. Vertical cuts in these soils may be unstable and may present a significant hazard because they can fail without warning. Therefore, temporary construction slopes greater than 5 feet high should not be steeper than one horizontal to one vertical (1H: 1V) and excavated material should not be placed within 10 feet of the crest of any excavated slope.

Unbraced excavations may experience some minor localized instability (i.e., sloughing). To reduce potential sloughing, excavated slopes should be covered with plastic for protection from rainfall and moisture changes. It should be emphasized that continuous observations by personnel from our office are important during trenching or excavation operations at the site.



#### **4.0 GENERAL COMMENTS**

If significant changes are made in the plans and specifications, the location of the proposed structure, or the loading conditions outlined in Section 1.4 are exceeded, a consultation should be arranged to review such changes with respect to the prevailing soil conditions. It may then be necessary to submit supplementary recommendations. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of Driesenga & Associates, Inc.

Driesenga & Associates, Inc. should be afforded the opportunity to review the project design drawings and specifications to verify the factors affecting subgrade and foundation performance comply with our recommendations.

It is recommended that the services of Driesenga & Associates, Inc. be engaged to observe excavation for the footings and to test and evaluate the soils in the footing excavations prior to placement of foundations in order to determine that the soils have the required bearing capacities. Monitoring and testing should also be performed to verify that suitable materials are used for controlled fills and that they are properly placed and compacted.

This report and any future reports or addenda performed for this site should be supplied to potential bidders prior to them submitting their proposals. We also recommend the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction.

This report was for geotechnical purposes only. We did not sample for environmental purposes or perform any analytical testing. However, the contractor should be prepared to handle environmental conditions encountered at this site that may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers. Any Environmental



Assessment reports prepared for this property should be made available for review by bidders and the successful contractor.

This report has been prepared solely for the use of the client for the project specifically described in this report. This report cannot be relied upon by other parties not involved in this project, unless written permission is granted by Driesenga & Associates, Inc. If this report or any of its contents are utilized by parties other than our original client and the project team members, Driesenga & Associates, Inc. can not be held responsible for the suitability of the field exploration, scope of services, or recommendations made for the new project. Driesenga & Associates, Inc. also is not responsible for the interpretation of our soil boring logs and the recommendations provided herein by other parties.

Driesenga & Associates, Inc. will evaluate this report for other parties and developments at this site, provided our original Client agrees to release this information in writing. However, before this report can be relied upon by other parties, Driesenga & Associates, Inc. must review the proposed development since the new project will likely require additional field exploration, laboratory tests, analysis, and modifications to our recommendations to adequately address the needs of the new project.



## **APPENDIX A**

**·FIGURE NUMBER 1 – SITE LOCATION·**

**·FIGURE NUMBER 2 – BORING LOCATIONS·**





**Figure Number: 1**  
Site Location

**Project Name**  
Oscoda Area Schools  
Community Center

**Project Number**  
2440779.3A

**Project Location**  
3550 East River Road,  
Oscoda, Michigan







**Figure Number: 2**

Boring Locations

**Project Name**

Oscoda Area Schools  
Community Center

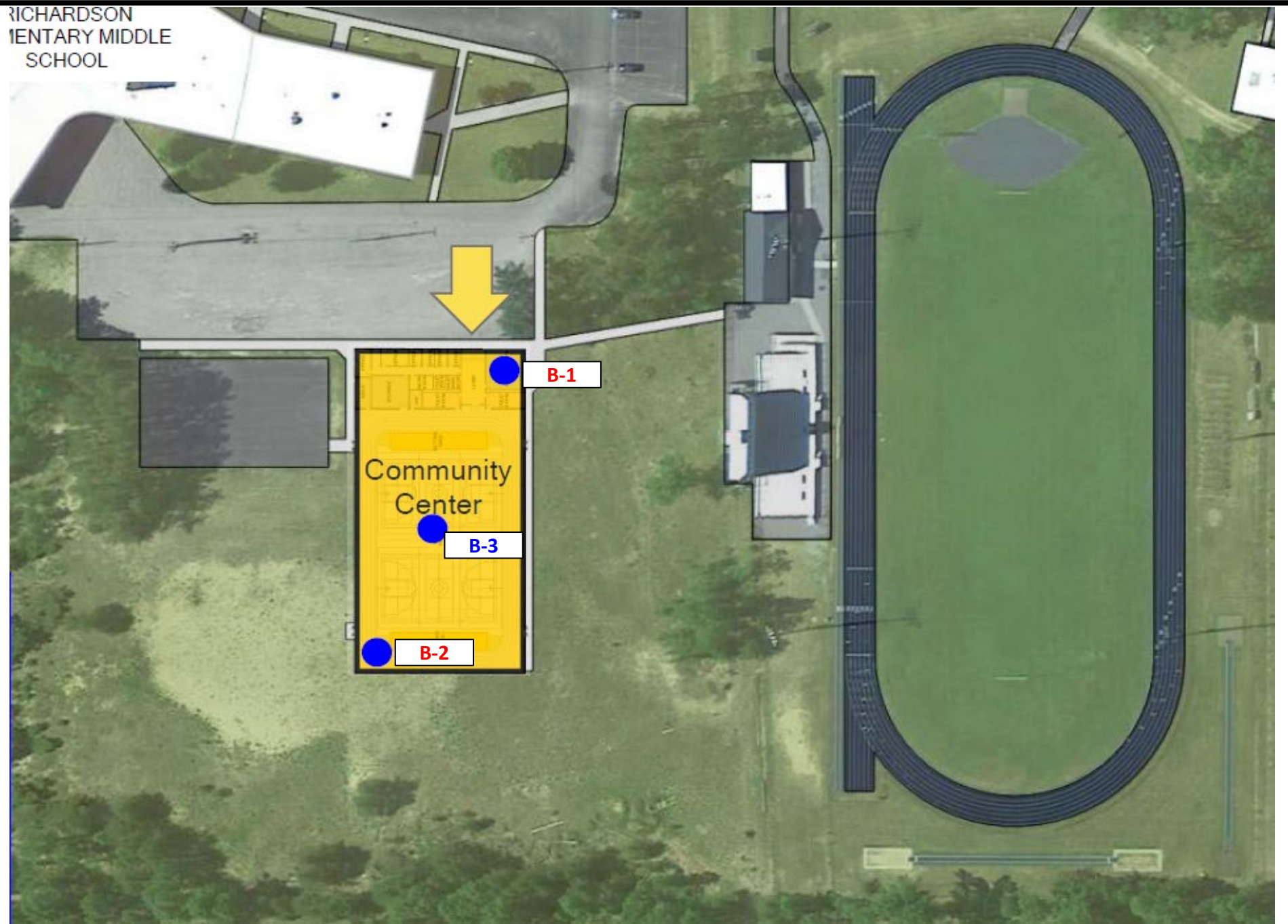
**Project Number**

2440779.3A

**Project Location**

3550 East River Road,  
Oscoda, Michigan

RICHARDSON  
ELEMENTARY MIDDLE  
SCHOOL



**DRIESINGA &  
ASSOCIATES, INC.**

Engineering · Surveying · Testing





**APPENDIX B**  
**·SOIL BORING LOGS·**



**Engineering · Surveying · Testing**

Project: Oscoda Area Schools Comm Center  
3550 East River Road  
Oscoda, Michigan  
Project No. 2440779.3A  
Client: Fleis & VandenBrink

Date Started : September 9, 2024  
Date Completed : September 9, 2024  
Hole Diameter : 6-inches  
Drilling Method : Hollow-Stem Auger  
Sampling Method : Split-Spoon Sampler

Drilling Company : BRAX Drilling  
Field Sampling : Tom  
Reviewed By : S. Ellison  
GW Encountered : 13'  
GW Completion : Collaspe @ 11.8'

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	Water Levels		Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
				▼ During Drilling	▽ After Completion							
DESCRIPTION												
0				TOPSOIL - 5 inches								
		SM/FILL		Fill - Silty SAND, medium dense, brown, moist.			1	3 5 6	11			
							2	2 5 5	10			
5							3	3 5 5	10			
		SM					4	3 4 4	8			
10												
							5	8 12 20	32			
15		SP		SAND, dense, brown, fine grained, trace silt, trace gravel, wet.								
							6	8 11 16	27			
20												
							7	6 9 15	24			
25		SW		SAND, medium dense to dense, brown, fine to coarse grained, trace gravel, trace silt, wet.								
							8	5 7 13	20			
30												





**Engineering · Surveying · Testing**



Project: Oscoda Area Schools Comm Center  
3550 East River Road  
Oscoda, Michigan

Project No. 2440779.3A

Client: Fleis & VandenBrink

Date Started : September 9, 2024  
Date Completed : September 9, 2024  
Hole Diameter : 6-inches  
Drilling Method : Hollow-Stem Auger  
Sampling Method : Split-Spoon Sampler

Drilling Company : BRAX Drilling  
Field Sampling : Tom  
Reviewed By : S. Ellison  
GW Encountered : 13'  
GW Completion : NA

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	Water Levels		Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %	
				▼ During Drilling	▽ After Completion								
DESCRIPTION													
0		SM		Silty SAND, loose to medium dense, brown, trace gravel, moist to wet.			1	1 3 4	7				
5	2						2 4 3	7					
	3						3 3 5	8					
10	4						3 5 5	10					
15		SW		SAND, medium dense to very dense, brown, fine to coarse grained, trace gravel, trace silt, wet.			5	3 5 18	23			▼	
20	6						4 7 10	17					
25	7						4 8 13	21					
30	8						5 12 19	31					





**Engineering · Surveying · Testing**

Project: Oscoda Area Schools Comm Center 3550 East River Road Oscoda, Michigan	Date Started : September 9, 2024	Drilling Company : BRAX Drilling
Project No. 2440779.3A	Date Completed : September 9, 2024	Field Sampling : Tom
Client: Fleis & VandenBrink	Hole Diameter : 6-inches	Reviewed By : S. Ellison
	Drilling Method : Hollow-Stem Auger	GW Encountered : 13'
	Sampling Method : Split-Spoon Sampler	GW Completion : NA

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	Water Levels	Auto-Hammer Used for SPT	Samples	Blow Count	N Value	Pocket Pen (tsf)	Water Level	Moisture Content %
				▼ During Drilling ▽ After Completion							
DESCRIPTION											
0		GW/FILL		Fill - SAND & GRAVEL - 1 inch							
				SAND, loose, brown, fine grained, trace silt, moist to wet.		1	2 3 5	8			
5		SP				2	2 3 4	7			
						3	3 3 4	7			
10						4	3 3 4	7			
15		SP		SAND, loose, brown, fine grained, trace silt, trace gravel, wet.		5	3 2 5	7			
20						6	7 10 17	27			
25		SW		SAND, dense to very dense, brown, fine to coarse grained, trace gravel, trace silt, wet.		7	9 10 16	26			
30						8	10 14 16	30			





**APPENDIX C**  
**·FIELD AND LABORATORY PROCEDURES·**



# CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

**Per ASTM D 2487—00  
(Based on Unified Soil Classification System)**

Soil Description: Secondary Soil Type BASIC SOIL TYPE, Consistency/Relative Density, Color, Supplemental Soil Type, Moisture, Miscellaneous comments.

Ex. Silty SAND, loose, brown, fine to medium, trace gravel, moist.

Secondary Soil Type – adjective for the BASIC SOIL TYPE describing material making up greater than 12% but less than 50% of the primary soil type by weight. For sands this also includes a description of grain size (fine, medium or coarse).

BASIC SOIL TYPE – primary constituent of sample; material making up greater than 50% of the sample by weight. Material is classified by grain size and material properties.

Consistency/Relative Density – a measurement of in-situ consistency or density of cohesive or cohesionless soils, respectively, based upon Standard Penetration Testing blow counts (N) per ASTM D 1586.

Color – visual inspection of soil appearance.

Supplementary Soil Type – a description of any other material that may be mixed with the BASIC SOIL TYPE. Qualifying terms are based on the percentage of the supplementary soil type in the sample by weight.

Moisture – description of the in-situ moisture content of the sample (dry, moist or wet).

Miscellaneous Comments – anything observed in the sample or in the field that does not fit into the above categories but should be noted (odor, etc.).

CALIBRATED AUTO HAMMER CONSISTENCY/RELATIVE DENSITY				
COHESIONLESS SOILS		COHESIVE SOILS		
SPT N-VALUES	IN-SITU RELATIVE DENSITY	SPT N-VALUES	SHEAR STRENGTH (PSF)	IN-SITU CONSISTENCY
0-3	VERY LOOSE	0-1	BELOW 250	VERY SOFT
4-8	LOOSE	2-3	250 - 500	SOFT
9-23	MEDIUM DENSE	4-6	500 - 1,000	MEDIUM STIFF
24-38	DENSE	7-12	1,000 - 2,000	STIFF
>38	VERY DENSE	13-25	2,000 - 4,000	VERY STIFF
		>26	OVER 4,000	HARD

STANDARD HAMMER CONSISTENCY/RELATIVE DENSITY				
COHESIONLESS SOILS		COHESIVE SOILS		
SPT N-VALUES	IN-SITU RELATIVE DENSITY	SPT N-VALUES	SHEAR STRENGTH (PSF)	IN-SITU CONSISTENCY
0-4	VERY LOOSE	0-2	BELOW 250	VERY SOFT
5-10	LOOSE	3-4	250 - 500	SOFT
11-30	MEDIUM DENSE	5-8	500 - 1,000	MEDIUM STIFF
31-50	DENSE	9-16	1,000 - 2,000	STIFF
>50	VERY DENSE	17-32	2,000 - 4,000	VERY STIFF
		>32	OVER 4,000	HARD

SUPPLEMENTAL TEXTURE QUALIFYING TERMS	
DESCRIPTOR	PERCENTAGE BY WEIGHT
TRACE	1-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

## SOIL CLASSIFICATION CHART (Per ASTM D2487)

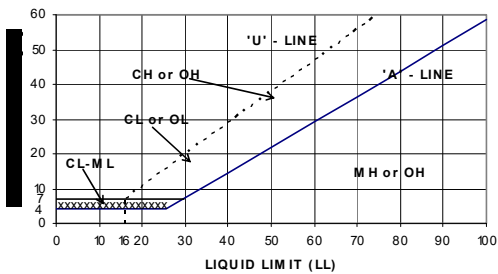
Criteria for Assigning Symbols and Group Names Using Laboratory Tests <sup>A</sup>			Soil Classification		
			Group Symbol	Group Name	
COHESIONLESS SOILS More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines <sup>C</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well-graded gravel <sup>F</sup>
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel <sup>F</sup>
		Gravels with Fines More than 12% fines <sup>C</sup>	Fines classify as ML or MH	GM	Silty gravel <sup>F,G,H</sup>
			Fines classify as CL or CH	GC	Clayey gravel <sup>F,G,H</sup>
	Sands More than 50% of coarse fraction retained on No. 4 Sieve	Clean Sands Less than 5% fines <sup>D</sup>	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand <sup>F</sup>
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand <sup>F</sup>
		Sands with Fines More than 12% fines <sup>D</sup>	Fines classify as ML or MH	SM	Silty sand <sup>G,H,I</sup>
			Fines classify as CL or CH	SC	Clayey sand <sup>G,H,I</sup>
COHESIVE SOILS 50% or more passes the No. 200 Sieve	Silt and Clays Liquid limit less than 50	Inorganic	$PI \geq 7$ and plots on or above 'A' line <sup>J</sup>	CL	Lean clay <sup>K,L,M</sup>
			$PI < 4$ or plots below 'A' line <sup>J</sup>	ML	Silt <sup>K,L,M</sup>
		Organic	Liquid limit - oven dried $< 0.75$	OL	Organic clay <sup>K,L,M,N</sup>
			Liquid limit - not dried $< 0.75$		Organic silt <sup>K,L,M,O</sup>
	Silt and Clays Liquid limit 50 or more	Inorganic	PI plots on or above 'A' line	CH	Fat clay <sup>K,L,M</sup>
			PI plots below 'A' line	MH	Elastic Silt <sup>K,L,M</sup>
		Organic	Liquid limit - oven dried $< 0.75$	OH	Organic Clay <sup>K,L,M,P</sup>
			Liquid limit - not dried $< 0.75$		Organic silt <sup>K,L,M,O</sup>
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat	

- A** Based on the material passing the 3-in. sieve
- B** If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name
- C** Gravels with 5 to 12% fines require dual symbols:  
 GW-GM well-graded gravel with silt  
 GW-GC well-graded gravel with clay  
 GP-GM poorly graded gravel with silt  
 GP-GC poorly graded gravel with clay
- D** Sands with 5 to 12% fines require dual symbols:  
 SW-SM well-graded sand with silt  
 SW-SC well-graded sand with clay  
 SP-SM poorly graded sand with silt  
 SP-SC poorly graded sand with clay

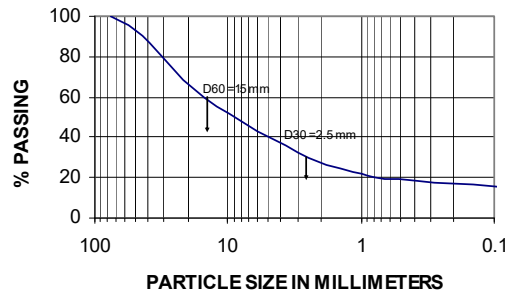
- E**  $Cu = D_{60}/D_{10}$   $Cc = (D_{30})^2/(D_{10} \cdot D_{60})$
- F** If soil contains  $\geq 15\%$  sand, add "with sand" to group name.
- G** If fines classify as CL-ML, use dual symbol GC-GM or SC-SM
- H** If fines are organic, add "with organic fines" to group name.
- I** If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.
- J** If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- K** If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant
- L** If soil contains  $\geq 30\%$  plus No. 200, predominantly sand, add "sandy" to group name.

- M** If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name
- N**  $PI \geq 4$  and plots on or above 'A' line.
- O**  $PI < 4$  or plots below 'A' line.
- P** PI plots on or above 'A' line.
- Q** PI plots below 'A' line.

### For classification of fine-grained soils and fine-grained fraction of coarse-grained soils



### SIEVE ANALYSIS





## **FIELD PROCEDURES**

The soil borings were performed using a truck-mounted drill rig equipped with an auto-hammer. Split-barrel samples were obtained in the soil below the bottom of the augers in general accordance with the Standard Method for Penetration and Split-Barrel Sampling of Soils. Samples were collected at 2.5 feet intervals to 10 feet below grade, and every 5 feet thereafter. After recovery, the samples were removed from the split-spoon sampler, visually reviewed and classified, placed in glass jars and transported to our laboratory for additional review.

Soil samples stored for extended periods are susceptible to moisture loss and are no longer indicative of the conditions originally encountered in the soil borings. Therefore, soil samples are usually stored in our laboratory for a period of 60 days, unless instructed otherwise.

Soil boring logs were prepared based on field notes and visual classification of the samples in the laboratory. Indicated on each soil boring log is the description of each stratum observed, the approximate depth and/or elevation of each stratum change observed, Standard Penetration Test resistance values, and the observed groundwater levels. The soil boring logs are presented in Appendix B.

## **LABORATORY PROCEDURES**

The laboratory testing program included supplementary visual classification of the samples in general accordance with the Unified Soil Classification System. The following two pages describe the soils classification procedure.



## **SECTION 012300 - ALTERNATES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Description of Alternates.
- B. Procedures for pricing Alternates.
- C. Documentation of changes to Contract Sum and Contract Time.

#### **1.2 GENERAL ALTERNATE REQUIREMENTS**

- A. The description of each Alternate is recognized to be incomplete and abbreviated, but requires that each change must be complete for the scope or work affected. Refer to applicable specification Sections and applicable Drawings for the specific requirements of work.
- B. Base Bid: Include work associated with described deductive alternates and exclude described additive alternates. Failure to submit proposals for all alternates may result in rejection of bid.

#### **1.3 DESCRIPTION OF ALTERNATE REQUIREMENTS**

- A. Alternates are defined as alternative products, materials, equipment, systems, methods, units of work, or major elements of construction which may, at Owner's option, be selected for the work in place of corresponding requirements of the Contract Documents. Selection may occur prior to the Contract date, or may be deferred for possible selection at a subsequent date.
- B. Include as part of each Alternate, miscellaneous devices, appurtenances, differences in utility or power requirements, and similar items incidental to or required for complete and functioning installation, whether or not specifically mentioned as part of the alternate description.
- C. Immediately following award of the Contract, prepare and distribute to each entity involved, notification of the status of each Alternate. Indicate whether alternates have been accepted, rejected, or deferred for consideration at a later date. Indicate a complete description of negotiated modifications to described scope of Alternates, if any.

#### **1.4 ACCEPTANCE OF ALTERNATES**

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at 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.

## 1.5 SCHEDULE OF ALTERNATES

- A. ALT C1: Asphalt path around Richardson Elementary School
  - 1. Base Bid: No pathway
  - 2. Add: 10ft asphalt path around Richardson.
- B. Alt C2: Sprinklers around Richardson Elementary School
  - 1. Base Bid: No Sprinklers
  - 2. Add: Sprinklers to the areas surrounding Richardson elementary
- C. Alt C3: Sprinklers around the Community Center
  - 1. Base Bid: No Sprinklers
  - 2. Add: Sprinklers to the areas surrounding the community center as show on the drawings
- D. Alt C4: Grill Canopy Concrete Pad Expansion
  - 1. Base Bid: As shown on drawings.
  - 2. Add: Expanded concrete pad as shown on drawings
- E. Alt C5: Repave Small Loop North of Richardson Elementary School
  - 1. Base Bid: Leave as existing
  - 2. Add: As shown on drawings
- F. Alt C6: Repave Large Loop in front of Richardson Elementary School
  - 1. Base Bid: Leave as existing
  - 2. Add: As shown on drawings
- G. Alt A1: Grill Canopy
  - 1. Base Bid: As shown on drawings
  - 2. Add: Grill Canopy and half height walls as shown on Drawings
- H. Alt A2: Wall Padding in Fieldhouse
  - 1. Base Bid: As shown on drawings.
  - 2. Add: Wall padding to all faces of the fieldhouse and along supplementary rooms as shown on the drawings

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 012300**





## SECTION 01 57 13

### TEMPORARY EROSION AND SEDIMENTATION CONTROL

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes the work required to provide and maintain temporary soil erosion and sedimentation control.

##### 1.02 JOB CONDITIONS:

- A. Requirements: Comply with Drawings and permit requirements.
- B. Permit: Obtain permit from local enforcing agency, if not already obtained.
- C. Time Limitations: MDOT 208.03B.

#### PART 2 - PRODUCTS

- 2.01 MATERIALS: MDOT 208.02 and as approved by the regulating agency.

#### PART 3 - EXECUTION

##### 3.01 PERFORMANCE:

- A. General: Abide with all applicable rules and regulations as established by the State of Michigan and the local regulating agency in conjunction with Act 451 of 1994, Natural Resources and Environmental Protection Act, Part 91 as amended, Michigan Soil Erosion and Sedimentation Control (formerly PA 347 of 1972, as amended).
- B. Sediment Removal:
  - 1. Take such steps as are necessary to assure the retention and removal of any sediment which enters a drainage system along the construction route before said system discharges into a stream, pond or lake.
  - 2. If eroded material is allowed to enter a storm sewer system, all catch basins, manholes, pipe and culverts shall be cleaned following construction prior to receipt of final payment. Unless Contractor can document positively to what extent an existing storm sewer system along the construction area was silted in prior to construction, no credit will be given for cleaning the system.
  - 3. Maintain roadways in a passable condition until paving is completed, including any maintenance and dust control.
- C. Construction of Soil Erosion and Sedimentation Control Measures: MDOT 208.03C.
  - 1. Provide and maintain the following temporary soil erosion and sedimentation control measures unless otherwise shown on the Drawings or in the permit:
    - a. Excavated or borrow material stockpile:
      - 1) Place silt fence around stockpile in a manner to prevent soil erosion from entering the drainage system or leaving the site.
    - b. Trench backfill in place.
      - 1) Place silt fence across trenches, ditches and around inlets to prevent soil erosion from leaving the site or entering the drainage system until:

- 2) Seed and mulch have been placed in non-paved areas.
- 3) Aggregate has been placed in bituminous and gravel areas.
- c. Dewatering discharge.
  - 1) Place bales of hay, straw and/or siltation fencing staked in place at point of discharge, adequately anchored.
- d. Grading limits.
  - 1) Place silt fence along down gradient side of all areas disturbed by grading operations.
- e. Catch basins.
  - 1) Provide inlet protection around catch basin and below grates. Remove after turf is established
- f. Culvert inlets.
  - 1) Place stone check dam and silt fence upstream of all culvert inlets.
- g. Drain cleanout.
  - 1) Excavate sediment basin and place stone check dam at downstream end prior to cleanout operation.

D. Maintenance of Soil Erosion and Sedimentation Control Measures: MDOT 208.03C.

E. Removal of Soil Erosion and Sedimentation Control Measures: MDOT 208.03D.

### 3.02 SCHEDULES:

A. MDOT Standard Plan R-96-E (6 sheets)

**END OF SECTION**

## SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Not required for this project.

#### 1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Concealed surface form-facing material.
2. Form-release agent.

- B. Shop Drawings: Not required for any form-facing or form materials on this job.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

#### 2.2 FORM-FACING MATERIALS

- A. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

## 2.3 RELATED MATERIALS

- A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.
- C. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
  - 1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
  - 1. Minimize joints.
  - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
  - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
  - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips.
  2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
  2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
1. Determine sizes and locations from trades providing such items.
  2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
1. Construct joints true to line with faces perpendicular to surface plane of concrete.
  2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  3. Place joints perpendicular to main reinforcement.
  4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
    - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  6. Space vertical joints in walls as necessary dictated by the Contractor's sequencing.
    - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- N. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- O. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  - 1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000

## SECTION 032000 - CONCRETE REINFORCING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel reinforcement bars.
  - 2. Welded-wire reinforcement.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Not required for this project.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Each type of steel reinforcement.
- B. Shop Drawings: Comply with ACI SP-066:
  - 1. Include placing drawings that detail fabrication, bending, and placement.
  - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
  - 1. Location of construction joints is subject to approval of Engineer.

### PART 2 - PRODUCTS

#### 2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615 Grade 60, deformed.
- B. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064, flat sheet.

## 2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
  - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
    - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Steel Tie Wire: ASTM A1064, annealed steel, not less than 0.0508 inch in diameter.

## 2.3 FABRICATING REINFORCEMENT

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

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protection of In-Place Conditions:
  - 1. Do not cut or puncture vapor retarder.
  - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
  - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
  - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.



- F. Splices: Lap splices as indicated on Drawings.
  - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
  - 2. Stagger splices in accordance with ACI 318.
- G. Install welded-wire reinforcement in longest practicable lengths.
  - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
    - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
  - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 8 inches for deformed wire.
  - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
  - 4. Lace overlaps with wire.

### 3.3 JOINTS

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

### 3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  - 1. Steel-reinforcement placement.

END OF SECTION 032000



## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

##### B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 033511 "Concrete Floor Finishes" for concrete sealing products, flatness and burnishing requirements, sub-floor preparation (beyond 3.8.C.2 here), and other final architectural finish specifics.

#### 1.2 DEFINITIONS

- ##### A. Cementitious Materials:
- Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

- ##### B. Water/Cement Ratio (w/cm):
- The ratio by weight of water to cementitious materials.

#### 1.3 PREINSTALLATION MEETINGS

- ##### A. Preinstallation Conference:
- Not required for this project, but in lieu of a preconstruction or preinstallation conference, the contractor is required to submit concrete placement plans.

#### 1.4 ACTION SUBMITTALS

- ##### A. Product Data:
- For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Aggregates.
6. Admixtures:

- a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
  7. Vapor retarders.
  8. Liquid floor treatments.
  9. Curing materials.
  10. Joint fillers.
- B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
  2. Minimum 28-day compressive strength.
  3. Durability exposure class.
  4. Maximum w/cm.
  5. Calculated equilibrium unit weight, for lightweight concrete.
  6. Slump limit.
  7. Air content.
  8. Nominal maximum aggregate size.
  9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
  10. Intended placement method.
  11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
  2. Admixtures.
  3. Curing compounds.
  4. Vapor retarders.
  5. Joint-filler strips.
- B. Material Test Reports: For the following, from a qualified testing agency:
1. Portland cement.
  2. Fly ash.
  3. Slag cement.
  4. Admixtures:
- C. Preconstruction Test Reports: For each mix design.
- D. Concrete Slab on Grade curing method used (of the 3 provided options) and written concrete curing plan for A/E review. This plan shall also confirm product data is compliant with floor finishes.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products that complies with ASTM C94 requirements for production facilities and equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94 and ACI 301.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301

2.2 CONCRETE MATERIALS

- A. Cementitious Materials:
  - 1. Portland Cement: ASTM C150, Type I.
  - 2. Fly Ash: ASTM C618, Class C or F.
  - 3. Slag Cement: ASTM C989, Grade 100 or 120.
  - 4. Blended Hydraulic Cement: ASTM C595, Type IL, portland-limestone cement, if desired
- B. Normal-Weight Aggregates: ASTM C33, coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: See structural notes, nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C260.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C494, Type A.
  - 2. Retarding Admixture: ASTM C494, Type B.

3. Water-Reducing and -Retarding Admixture: ASTM C494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

E. Water and Water Used to Make Ice: ASTM C94, potable

## 2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, thickness noted on the drawings. Include manufacturer's recommended adhesive or pressure-sensitive tape.

## 2.4 LIQUID FLOOR TREATMENTS

1. Refer to Specification 033511 Section 2.2 for product information.

## 2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
    - a. Ambient Temperature Below 50 deg F: Black.
    - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
    - c. Ambient Temperature Above 85 deg F: White.
- C. Curing Paper: 8-foot-wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
- D. Water: Potable or complying with ASTM C1602.

## 2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: Ardex Adriseal Plus Rapid Two-Part with backer rod.

## 2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

- B. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

## 2.8 CONCRETE MIXTURES

- 1. Refer to the structural notes and drawings for information on required mix designs. Please also refer to the civil-site drawings for exterior pavement mix designs not inclusive to the structural drawings.

## 2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94, and furnish batch ticket information.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
  - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

### 3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
  - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
  - 2. Face laps away from exposed direction of concrete pour.
  - 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
  - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
  - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
  - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
  - 7. Protect vapor retarder during placement of reinforcement and concrete.
    - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

### 3.3 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
  - 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
  - 2. Place joints perpendicular to main reinforcement.
    - a. Continue reinforcement across construction joints unless otherwise indicated.
    - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
    - c. Provide Sika Speed Plate dowel at construction joints, 1/4" thickness, 18" O.C., or other approved equal.
  - 3. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints per the drawings.
  - 1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks. Cut every other wire across the joint.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants are indicated.
  - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

### 3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
  - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
  - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement.



- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
  2. Deposit concrete to avoid segregation.
  3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
  4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
    - a. Do not use vibrators to transport concrete inside forms.
    - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
  2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  3. Maintain reinforcement in position on chairs during concrete placement.
  4. Screed slab surfaces with a straightedge and strike off to correct elevations.
  5. Level concrete, cut high areas, and fill low areas.
  6. Slope surfaces uniformly to drains where required.
  7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
  8. Do not further disturb slab surfaces before starting finishing operations.

### 3.5 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
  - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
  - b. Remove projections larger than 1 inch.
  - c. Tie holes do not require patching.
  - d. Surface Tolerance: ACI 117 Class D.
  - e. Apply to concrete surfaces not part of slabs

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.6 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Refer to Specification 033511 for further information.
- B. Trowel Finish:
  1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
  2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
  3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  4. Do not add water to concrete surface.
  5. Do not apply hard-troweled finish to concrete, which has total air content greater than 3 percent.
  6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  7. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
  1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
  2. Coordinate required final finish with Architect before application.

### 3.7 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
  1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
  2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
  3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases as indicated on Drawings.
3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
4. Prior to pouring concrete, place and secure anchorage devices.
  - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - b. Cast anchor-bolt insert into bases.
  - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.8 CONCRETE CURING

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

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
  - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
  - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
  - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
  - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
  - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions. Not permitted in the field house, do not use an agent.
    - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
    - 2) Maintain continuity of coating and repair damage during curing period.

- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
  2. Interior Concrete Slab on Grade Floors (Field House and Administrative Area):
    - a. Curing - Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. Unless approved otherwise in writing by Architect and accepted flooring manufacturers, cure slabs and floors to receive adhesive-applied flooring using one of the following methods at the Contractor's preference:
      - 1) **Option 1: Moisture Curing:** Keep surfaces continuously moist for not less than seven days with the following materials:
        - a) Water.
        - b) Continuous water-fog spray
        - c) Absorptive cover, water-saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
      - 2) **Option 2: Moisture-Retaining-Cover Curing:** Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
        - a) Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
        - b) Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
        - c) Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
      - 3) **Option 3: Curing Compound:** Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
        - a) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
    - b. Floors to Receive Curing Compound:

- 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Maintain continuity of coating, and repair damage during curing period.
- 4) Do not apply curing compound in the field house slab.
- 5) Refer to Specification 033511 Concrete Floor Finishes for further information.

c. Floors to Receive Curing and Sealing Compound:

- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.
- 4) Do not apply a cure and seal compound in the field house slab.
- 5) Refer to Specification 033511 Concrete Floor Finishes for further information.

### 3.9 TOLERANCES

- A. Conform to ACI 117.

### 3.10 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than three days' old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
  4. Rinse with water; remove excess material until surface is dry.
  5. Apply a second coat in a similar manner if surface is rough or porous.
  6. Do not apply liquid floor treatments to the field house slab.
  7. Refer to Specification 033511 Concrete Floor Finishes for further information.

### 3.11 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31.
  2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
  3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
    - a. Test reports to include reporting requirements of ASTM C31, ASTM C39/, and ACI 301, including the following as applicable to each test and inspection:
      - 1) Project name.
      - 2) Name of testing agency.
      - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
      - 4) Name of concrete manufacturer.
      - 5) Date and time of inspection, sampling, and field testing.
      - 6) Date and time of concrete placement.
      - 7) Location in Work of concrete represented by samples.
      - 8) Date and time sample was obtained.
      - 9) Truck and batch ticket numbers.
      - 10) Design compressive strength at 28 days.
      - 11) Concrete mixture designation, proportions, and materials.
      - 12) Field test results.
      - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
      - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
1. Headed bolts and studs.
  2. Verification of use of required design mixture.
  3. Concrete placement, including conveying and depositing.
  4. Curing procedures and maintenance of curing temperature.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172 shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143:
  - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - b. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231 pressure method, for normal-weight concrete;
  - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064:
  - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31:
  - a. Cast and laboratory cure two sets of two 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39.
  - a. Test one cylinder at 7 days and two cylinders at 28 days. If the test cylinders at 28-days meet strength averages, test the final cylinder. If not, hold the final cylinder for a 56-day test.
7. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
8. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 72 hours of completion of floor finishing and promptly report test results to Architect.

### 3.12 PROTECTION

- A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.

5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000



## **SECTION 033511 - CONCRETE FLOOR FINISHES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Clear coatings as final floor finish.
- B. Polished concrete.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

#### **1.3 DEFINITIONS**

- A. DCOF: Dynamic Coefficient of Friction.
- B. Slip-Resistant: Installed flooring surface which has a wet coefficient of friction of 0.42, minimum, as measured according to ANSI A137.1 (DCOF Slip Resistance Test).

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work with concrete floor placement and concrete floor curing.
- B. Preinstallation Meeting:
  - 1. Convene one week before starting work of this Section.
  - 2. Conduct a review of procedures required to produce specified results.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - 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. Product Data: Manufacturer's published data and installation instructions for concrete polishing system and finishing products, including manufacturer's installation instructions, information on compatibility of different products, and limitations.
- D. Selection Samples: Provide color samples for Architect selection representative of range of colors within installation.
  - 1. Joint filler material.

- E. Manufacturer's Certificate - Polished Finish System: Provide letter of certification from manufacturer stating that installer is a certified applicator and is familiar with manufacturers required procedures for application of specified finish system
- F. Manufacturer's Instructions - Polished Finish System: Indicate manufacturer's product and system name, application specifications and procedures, and conditions requiring special attention or procedures under indicated project conditions.
- G. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- H. Warranty Documentation: Ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications - Polished Finish: Company specializing in performing work of the type specified and with minimum five years of documented experience and approved by manufacturer.

#### **1.7 MOCK-UP**

- A. Comply with general mock-up requirements specified in Section 014000.
- B. Mock-up: For polished finish, construct mock-up area under conditions similar to those that will exist during application to demonstrate sheen variation (if any) and standard of workmanship. Include coatings and joint filler material in mock-up.
  - 1. Mock-Up Size: 10 feet square.
  - 2. Locate where directed.
  - 3. Mock-up may remain as part of the work.

#### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

#### **1.9 FIELD CONDITIONS**

- A. 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.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F minimum.

- D. Polished Finish System: Comply with system manufacturer's written instructions for ambient temperature and other conditions affecting installation performance.
  - 1. New concrete must be cured minimum 45 days, or as otherwise directed by system manufacturer before commencement of system application.

#### **1.10 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a two-year period commencing on the Date of Substantial Completion.
- C. Manufacturer Warranty: Provide 10-year manufacturer warranty for specified densifying and hardening system indicating treated floor will remain hardened, dustproof and water-repellant commencing on the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS, GENERAL**

- A. Where multiple products are applied to the same concrete surface, verify compatibility with manufacturer.
- B. Where sealed concrete is specified, apply a minimum of two coats of curing and sealing compound at new concrete as specified in Section 033000, or a compatible sealer specified in this Section where only one coat of curing and sealing compound has been applied.

#### **2.2 COATINGS**

- A. High Gloss Clear Sealer: Transparent, non-yellowing, water-based coating.
  - 1. Solids Content: 25 percent, minimum, when measured by volume.
  - 2. Acceptable Manufacturers:
    - a. Dayton Superior Corporation; Cure & Seal 25%:  
[www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company: SUPER DIAMOND CLEAR VOX:  
[www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. L&M Construction Chemicals, Inc., a subsidiary of Laticrete International, Inc; Dress & Seal WB 25: [www.lmcc.com](http://www.lmcc.com).
    - d. W. R. Meadows, Inc.; VOCOMP-25: [www.wrmeadows.com](http://www.wrmeadows.com)
    - e. Substitutions: See Section 016000 - Product Requirements.

## **2.3 POLISHED CONCRETE SYSTEM**

- A. Polished Concrete System: Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen.
1. Slip-Resistance: Installed polished flooring must be slip resistant in paths of egress, and other locations as required by applicable code.
  2. Densifier: Sodium silicate or Lithium Silicate solution that densifies, hardens, and dustproofs concrete surface.
    - a. Odorless, inorganic water based and VOC compliant chemical.
  3. Surface Colorant:
    - a. None (natural).
  4. Acceptable Manufacturers:
    - a. Ameripolish, Inc; Ameripolish Polished Concrete System: [www.ameripolish.com/#sle](http://www.ameripolish.com/#sle).
    - b. Advanced Floor Products, Inc.; Retro Plate 99: [www.retroplatesystem.com](http://www.retroplatesystem.com).
    - c. ARDEX Engineered Cements: [www.ardexamericas.com](http://www.ardexamericas.com).
    - d. Euclid Chemical Company; DOUBLE DIAMOND POLISHED CONCRETE FLOOR SYSTEMS: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - e. H & C, by Sherwin-Williams; Polished Concrete System: [www.hcconcrete.com](http://www.hcconcrete.com).
    - f. LATICRETE L&M; FGS Permashine Concrete Polishing System: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - g. L.M. Scofield Company; SCOFIELD Formula One Ground & Polished Concrete Systems: [www.scofield.com/#sle](http://www.scofield.com/#sle).
    - h. PROSOCO, Inc.; Consolideck Polished Concrete System: [www.prosoco.com/consolideck/sle](http://www.prosoco.com/consolideck/sle).
    - i. Substitutions: See Section 016000 - Product Requirements.

## **2.4 RELATED MATERIALS**

- A. Neutralizing Agent: Tri-sodium phosphate.

- B. Penetrating Sealer: Manufacturer's recommended low VOC sealer/repellent for immediate water and stain resistance for polished concrete flooring systems.
- C. Joint Filler: Semi-rigid, 2 component, self-leveling, 100% solids polyurea:
  - 1. Durometer Shore A hardness: 80 minimum.
  - 2. Color as selected by Architect from manufacturer's full range.
  - 3. Acceptable Manufacturers:
    - a. Euclid Chemical.
    - b. Hi-Tech Systems.
    - c. Metzger/McGuire.
    - d. Substitutions: See Section 016000 - Product Requirements.
- D. Water: Potable.

### **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. Do not proceed until unsatisfactory conditions are corrected.

#### **3.2 GENERAL**

- A. Apply materials in accordance with manufacturer's instructions.
- B. Prepare surfaces as required by finishing system manufacturer.

#### **3.3 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, matching approved mock-ups for color, special effects, sealing and workmanship.
  - 1. Use application materials, methods, and procedures required by coating manufacturer to establish and maintain specified warranty.

### **3.4 CONCRETE POLISHING**

- A. Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer to achieve the following appearance qualities:
- B. Aggregate Exposure: Class B; described as follows:
  - 1. Fine Aggregate (Salt and Pepper): Approximately 1/16 inch surface cut depth; fine aggregate exposure with little or no medium aggregate exposure at random locations.
- C. Final Polished Sheen: Semi-gloss finish; other sheens are included as comparison to illustrate required sheen; final sheen is before addition of any sealer or coating, regardless of whether that is also specified or not.
  - 1. Semi-Gloss Finish: Semi-polished; reflecting overhead and side images from 35 to 45 feet away; images not quite sharp but easily identified; 1500 grit; DOI 40-69%.
- D. Application:
  - 1. Floor Surface Grinding and Treatment:
    - a. Diamond grind concrete floor surfaces with power disc machine recommended by floor finish manufacturer.
    - b. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
    - c. Sequence from coarse to fine grit.
    - d. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level.
    - e. Expose aggregate in concrete surface as determined by approved mock-up.
    - f. Apply joint and chip filler to match approved sample.
  - 2. Apply Concrete Densifier/Hardener:
    - a. Follow manufacturer's instructions.
    - b. Clean surface thoroughly.

- c. Apply liquid densifier.
  - d. Remove all densifier and scrub clean.
  - e. Allow to dry.
3. Floor Surface Polishing
- a. Diamond polish concrete floor surfaces with power disc machine.
  - b. Finish edges to match field areas.
  - c. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level.
  - d. Floor shall be thoroughly cleaned between each grit pass to remove all loose material.
  - e. Level of sheen shall match that of approved mock-up.
4. Repair any defects and re-polish to match sample.
5. Topical Sealers: Product compatible with floor finishing system.
- a. Install penetrating sealer per manufacturer's written instructions.

### **3.5 PROTECTION**

- A. Protect finished surface as required and as recommended by manufacturer of finishing system.
- B. Close areas to traffic during floor application and after for 24 hours

**END OF SECTION 033511**





## **SECTION 042000 - UNIT MASONRY**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Concrete block.
- B. Cast stone units.
- C. Mortar and grout.
- D. Accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing control and expansion joints.

#### **1.3 REFERENCE STANDARDS**

- A. ACI 315 - Details and Detailing of Concrete Reinforcement.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ACI 318 - Building Code Requirements for Structural Concrete; 2019 (Reapproved 2022).
- D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.
- G. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- I. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- M. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

- N. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.
- O. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2023.
- P. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- Q. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- R. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).
- S. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.
  - 1. Require attendance by Contractor, Superintendent, all relevant installers, and parties directly affecting the work of this Section.
  - 2. Review locations of control joints and expansion joints.
  - 3. Review materials, conditions of installation, installation procedures, and coordination with related work.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, mortar, and masonry accessories.
- C. Shop Drawings: Submit drawings indicating steel reinforcing in compliance with ACI 315.
  - 1. Indicate bar sizes, spacing, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

- F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

#### **1.6 QUALITY ASSURANCE**

- A. Conform to TMS 602 for masonry inspection and testing requirements.
- B. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
  - 1. Maintain one copy of each document on project site.
- C. Fire Rated Assemblies: Comply with applicable code for specified requirements for fire rated masonry construction.
- D. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- E. 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. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store materials on elevated platforms, under cover, and in a dry location. Do not install damp materials.

#### **1.8 FIELD CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides of walls and hold securely in place.
- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Preparation:
  - a. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
  - b. Do not lay masonry units having a temperature below 20 degrees F.
  - c. For brick units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
    - 1) For units with surface temperatures above 32 degrees F, wet with water heated to above 70 degrees F.
    - 2) For units with surface temperature below 32 degrees F, wet with water heated to above 130 degrees F.
2. Cold-Weather Construction: When the ambient temperature is within the limits indicated, use the following procedures. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperatures selected within 10 degrees F.
  - a. 40 to 32 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Follow normal masonry procedures for grout.
  - b. 32 to 25 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry.
  - c. 25 to 20 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F if grouting. Use heat on both sides of walls under construction.
  - d. 20 deg F and below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F. Provide enclosures and use heat on both sides of walls under construction to maintain temperatures above 32 deg F within the enclosure for at least 24 hours after laying units.

3. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection. Temperature ranges indicated apply to mean daily air temperatures, except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
    - a. 40 to 25 deg F: Cover masonry with a weather-resistant membrane for 48 hours after construction.
    - b. 25 to 20 deg F: Use heat source on both sides of masonry under construction. Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi/hr.
    - c. 20 deg F and below: Provide enclosure and heat to maintain temperatures above 32 degrees F within enclosure for 48 hours after construction.
  4. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MASONRY UNITS (CMU)**

- A. Concrete Block: ASTM C90, normal weight.
1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the Drawings for specific locations.
  2. Special Shapes: Provide nonstandard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions.
    - a. Provide bullnose units for outside corners.
    - b. Provide special shapes for lintels, corners, jambs, sashes, movement joints, bond beams, and other special conditions indicated on drawings.

### **2.2 CAST STONE UNITS**

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural stone, complying with ASTM C1364.
1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.

2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
4. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
  - a. Pieces More than 24 inches in Any Dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.
5. Fabrication:
  - a. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.
  - b. Where corner detail is not indicated, form external corners to quirk joint profile.
  - c. Cut drip slot in bottom surface of work projecting more than 1/2 inch over wall surfaces. Size slot not less than 3/8 inch wide and 1/4 inch deep; full width of projection.
6. Color: As selected by Architect.

### **2.3 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91/C91M.
- B. Mortar Cement: ASTM C1329.
- C. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction.
  1. Not more than 0.60 percent alkali.
  2. Hydrated Lime: ASTM C207, Type S.
  3. Mortar Aggregate: ASTM C144.
  4. Grout Aggregate: ASTM C404.
- D. Water: Clean and potable.
- E. Admixtures: Not permitted unless specified, or requested by Contractor in writing and approved in writing by Architect.

- F. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.
- G. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
  - 1. Type: Fine.

## **2.4 REINFORCEMENT AND ANCHORAGE**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; uncoated.
- B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Ladder.
  - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to 16 CFR 1201 Class B.
  - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

## **2.5 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell neoprene or urethane; oversized 50 percent to joint width; self expanding; in maximum lengths available.
  - 1. Complying with ASTM D 1056, Grade 2A1.
  - 2. Acceptable Manufacturers:
    - a. Hohmann & Barnard, Inc.: [www.h-b.com/sle](http://www.h-b.com/sle).
    - b. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.
- C. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- D. Sealants: Types required by flashing manufacturer to suit indicated installation and service conditions.

- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## **2.6 LINTELS**

- A. Steel Lintels: Specified in Section {id\#203}.
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMU matching adjacent CMU in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure lintels before handling and installing. Temporarily support build-in-place lintels until cured.
  - 1. Use masonry lintels in concrete masonry unit walls where lintel is exposed, and as specified in Drawings:

## **2.7 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Masonry Below Grade in Contact With Earth: Type M.
  - 2. Interior Masonry: Type S.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other Sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.2 PREPARATION**

- A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.3 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.



### **3.4 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave unless otherwise required for work in other Sections.

### **3.5 PLACING AND BONDING**

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### **3.6 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on Drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Place continuous reinforcement around corners.

- E. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- F. Lap joint reinforcement ends minimum 12 inches.
- G. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

### **3.7 LINTELS**

- A. Install steel lintels over openings where indicated.
- B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
  - 1. Reinforced Lintels: Place reinforcing as indicated on Drawings.
- C. Maintain minimum 8 inch bearing on each side of opening.

### **3.8 GROUTED COMPONENTS**

- A. Reinforce bond beams as indicated on Drawings.
- B. Grout solid all hollow concrete unit masonry located below grade, at bond beams, and at other locations indicated.
- C. At bearing locations, fill masonry cores with grout for a minimum 8 inches both sides of opening unless otherwise indicated in drawings.

### **3.9 CONTROL AND EXPANSION JOINTS**

- A. Size control joints as indicated on Drawings; if not shown, 3/8 inch wide.
- B. Do not continue horizontal joint reinforcement through control or expansion joints.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- D. If control joint locations are not indicated on drawings, locate control joints in CMU walls complying with the NCMA TEK note recommendations and at wall height changes; within ten feet of corners; at wall thickness changes; at bond beam breaks; at abutments of columns and walls; at abutment of cold garages to warm basements or walls; at openings in walls such as doors and windows; and at intervals in continuous walls not exceeding 20 feet in length, unless more restrictive spacing is recommended in the NCMA TEK notes.

### **3.10 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames, fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other Sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### **3.11 TOLERANCES**

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/8 inch, plus 1/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **3.12 CUTTING AND FITTING**

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.13 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

1. See Structural Drawings for additional requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

### **3.14 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with specified cleaning solution, at low pressure or by hand methods only; do not introduce excessive moisture into masonry wall surfaces during cleaning operations.
- D. Use non-metallic tools and stiff brushes in cleaning operations.

### **3.15 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
  1. Install required protection of installed work at the end of each work day.

**END OF SECTION 042000**

## SECTION 042200 - CONCRETE UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Concrete masonry units.
  - 2. Steel reinforcing bars.

#### 1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product and block.
- B. Shop Drawings: Not required for subsurface masonry walls on these projects.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties and material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include product data for mortar mixes required to comply with property specification.
  - 2. Include product data for grout mixes required to comply with compressive strength requirement.

#### 1.5 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

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

## PART 2 - PRODUCTS

### 2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

### 2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with integral water repellent.
- C. CMUs: ASTM C90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3250 psi
  - 2. Density Classification: Normal weight.
- D. Concrete Building Brick: ASTM C55.

### 2.3 STEEL LINTELS

- A. Steel Lintels: Provide miscellaneous, galvanized, loose angle lintels per the structural drawings located per the architectural elevations.

### 2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Masonry Cement: ASTM C91.

- D. Aggregate for Mortar: ASTM C144.
  - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C404.
- F. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from the same manufacturer.
- H. Water: Potable.

## 2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615 Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. Bar positioners are only required if the contractor deems necessary.
- C. Masonry-Joint Reinforcement, General: ASTM A951.
  - 1. Exterior Walls: Hot-dip galvanized carbon steel.
  - 2. Wire Size for Side Rods: 9 ga
  - 3. Wire Size for Cross Rods: 9 ga
  - 4. Spacing of Cross Rods: Not more than 16 inches o.c.
  - 5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

## 2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A153, Class B-2 coating.
  - 2. Steel Plates, Shapes, and Bars: ASTM A36.

## 2.7 EMBEDDED FLASHING MATERIALS

- A. Not required for below-grade masonry walls. Refer to the architectural drawings for any flashing requirements for brick veneers or exterior-facing walls.

## 2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226, Type I (No. 15 asphalt felt).

## 2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Use masonry cement mortar unless otherwise indicated.
  - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For masonry below grade or in contact with earth, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  - 3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143.



## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

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

### 3.2 TOLERANCES

A. Dimensions and Locations of Elements:

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

B. Lines and Levels:

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

C. Joints:

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

### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.5 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at corners by using prefabricated L-shaped units.

### 3.6 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level B in TMS 402/ACI 530/ASCE 5.
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof
- D. Testing required:
  - 1. Mortar prism test (2 total)
  - 2. Grout compressive test (2 total)

### 3.7 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
  - 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

### 3.8 MASONRY WASTE DISPOSAL

- A. Waste Disposal: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, off-site in an approved dumpster or other recycling location. Do not crush or use for fill.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

END OF SECTION 042200



## SECTION 051200 – STRUCTURAL STEEL FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 053100 "Steel Decking" for field installation of structural connectors through deck.
2. Section 052100 "Steel Joist Framing" for steel joist products.

#### 1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Not required for steel fabrication or erection unless specifically requested by the owners and/or owners' representative.

#### 1.4 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. Anchor rods.
3. Shop primer.
4. Galvanized-steel primer.
5. Galvanized repair paint.
6. Shrinkage-resistant grout.

- B. Shop Drawings: Show fabrication of structural-steel components.

- C. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 360.
  - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
  - 1. Option 3 and 3B: Design connections and final configuration of member reinforcement at connections in accordance with AISC 303 by fabricator's qualified professional engineer.
    - a. Use Allowable Strength Design (ASD); connections reactions (RXN) are given as values from the controlling ASD load combination.
- C. Moment Connections: Type FR, fully restrained.
- D. Construction: Moment frames, ordinary, R=3.0

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes, Channels: ASTM A992, Grade 50.
- B. Angles: ASTM A36, Grade 36.

- C. Plate and Bar: ASTM A36, Grade 36.
- D. Cold-Formed Hollow Structural Sections (Square, Rectangular & Round): ASTM A500, Grade C structural tubing.
- E. Welding Electrodes: Comply with AWS requirements, min. E70xx electrodes, typically.

## 2.3 BOLTS AND CONNECTORS

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

## 2.4 RODS

- A. Headed Anchor Rods: ASTM F1554, Grade 36 or Grade 55, weldable, straight. Refer to the Structural Drawings.
  - 1. Finish: Hot-dip zinc coating, ASTM A153, Class C.
- B. Threaded Rods: ASTM A36.
  - 1. Finish: Hot-dip zinc coating, ASTM A153, Class C.

## 2.5 PRIMER

- A. Steel Primer:
  - 1. Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

## 2.6 SHRINKAGE-RESISTANT GROUT

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

## 2.7 FABRICATION

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

## 2.8 SHOP CONNECTIONS

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

1. Joint Type: Snug tightened, including moment frames (no slip critical).
- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

## 2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123.
1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

## 2.10 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  2. Surfaces to be field welded.
  3. Galvanized surfaces unless indicated to be painted.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
1. SSPC-SP 2.
- C. Surface Preparation of Galvanized Steel to be Painted: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner.
- D. Priming Galvanized Steel to be Painted: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with AISC 303 and AISC 360.
- B. Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of baseplate.
  - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
- C. Maintain erection tolerances of structural steel within AISC 303.

### 3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
  - 1. Joint Type: Snug tightened, including moment frames.
- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

### 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
  - 1. Verify weld materials and inspect welds.
  - 2. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
  - 1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
  - 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1.

END OF SECTION 051200



## SECTION 052100 - STEEL JOIST FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. K-series steel joists with or without top chord extensions (TCX).
2. Steel joist accessories.

#### 1.2 ACTION SUBMITTALS

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

B. Shop Drawings:

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

#### 1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer certificates.

B. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel in accordance with AWS D1.1, "Structural Welding Code - Steel."

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Vulcraft
- B. New Millenium
- C. Canam
- D. Others, as reviewed and approved by the Architect.

### 2.2 STEEL JOISTS

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

### 2.3 PRIMERS

- A. Primer:
  - 1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15. Grey.

### 2.4 STEEL JOIST ACCESSORIES

- A. Bridging:
  - 1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Furnish column extensions, either extended bottom-chord elements or a separate extension unit at column line location joists.
- C. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

### 2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.
- B. Apply one coat of shop primer to joists and joist accessories.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction in accordance with SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.
  - 1. Before installation, splice joists delivered to Project site in more than one piece.
  - 2. Space, adjust, and align joists accurately in location before permanently fastening.
  - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
- C. Field weld joists to supporting steel framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using carbon-steel bolts as dictated by the joist shop drawings and per OSHA requirements.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for high-strength structural bolt installation and tightening requirements.
- F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

### 3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Visually inspect field welds in accordance with AWS D1.1.
- C. Visually inspect bolted connections.
- D. Prepare test and inspection reports.

END OF SECTION 052100



## SECTION 053100 - STEEL DECKING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Roof deck.

#### 1.2 ACTION SUBMITTALS

A. Product Data:

1. Roof deck.

B. Shop Drawings:

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

#### 1.3 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For tests performed by a qualified testing agency, indicating that any proposed substitute power-actuated mechanical fasteners comply with requirements.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

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

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

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

### 2.2 ROOF DECK

- A. Vulcraft
- B. New Millenium
- C. Epic
- D. Canam
- E. Others as reviewed and approved by the Architect.
- F. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
  - 1. Prime-Painted Steel Sheet: ASTM A1008, Structural Steel (SS), Grade 50 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer. G60 Galvanized.
    - a. Color: Manufacturer's standard Gray bottom side.
  - 2. Deck Profile: As indicated on the Structural Drawings.
  - 3. Profile Depth: 1-1/2 inches.
  - 4. Design Uncoated-Steel Thickness: As indicated.
  - 5. Span Condition: Triple span or more.
  - 6. Side Laps: Overlapped.

### 2.3 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, per the drawings.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.



- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 50,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- G. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- H. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- I. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

#### 3.2 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members as directed on the Structural Drawings.

- B. Side-Lap and Perimeter Edge Fastening: As directed on the Structural Drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches, with end joints as follows:
  - 1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck. Space welds or mechanical fasteners not more than 12 inches apart with at least one weld or fastener at each corner.
  - 1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

### 3.3 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780 and manufacturer's written instructions.
- B. Repair Painting:
  - 1. Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
  - 2. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
  - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
    - a. Field welds will be subject to visual inspection.

2. Steel decking will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 053100



## **SECTION 055000 - METAL FABRICATIONS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Shop fabricated steel items, including:
  - 1. Steel framing and supports for mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Bollards.
  - 4. Door frames for overhead door openings.
  - 5. Slotted channel framing (Unistrut).
  - 6. Embed plates.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#173} - {t\#173}: Placement of metal fabrications in masonry.
- B. Section {id\#4044} - {t\#4044}: Paint finish.
- C. Section {id\#4045} - {t\#4045}: Paint finish.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- F. 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; 2023.
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- I. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- J. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
- K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- L. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. 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.
  - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
    - a. Include the following, as applicable:
      - 1) Design criteria.
      - 2) Engineering analysis depicting stresses and deflections.
      - 3) Member sizes and gauges.
      - 4) Details of connections.
      - 5) Support reactions.
      - 6) Bracing requirements.
  - 3. Provide Shop Drawings for the following:
    - a. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- C. Delegated Design Data: Where indicated and as required by authorities having jurisdiction.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

- F. Designer's Qualification Statement.

## **1.5 QUALITY ASSURANCE**

- A. Designer Qualifications: Design indicated fabrication items under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

## **1.6 FIELD CONDITIONS**

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

## **1.7 COORDINATION**

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Engage a qualified professional engineer registered in the project State to design metal fabrications complying with performance requirements and design criteria indicated.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### **2.2 MATERIALS - STEEL**

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than the following:
  - 1. W-Shapes: 60 percent.

2. Channels, Angles: 60 percent.
  3. Plate and Bar: 25 percent.
  4. Cold-Formed Hollow Structural Sections: 25 percent.
  5. Steel Pipe: 25 percent.
  6. All Other Steel Materials: 25 percent.
- B. Steel Sections: ASTM A36/A36M.
- C. Plates: ASTM A283/A283M.
- D. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- E. Slotted Channel Fittings: ASTM A1011/A1011M.
- F. Fasteners: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select for type, grade, and class required.
1. Provide stainless-steel fasteners for fastening stainless steel.
  2. Dissimilar Metals: Type 304 stainless-steel fasteners.
  3. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Bolts and Nuts (Weathering Conditions): Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- I. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- J. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.



- L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors: Torque-controlled expansion anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- N. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- O. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
  - 1. Basis of Design Product: Subject to the requirements provide Sherwin-Williams Alkyd Universal Metal Primer, Kem Kromik B-50 Series or a comparable approved product of one of the following:
    - a. AkzoNobel; International Paints/Devoe Coatings.
    - b. Benjamin Moore & Co.
    - c. PPG Architectural Finishes, Inc.
- P. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type II - Organic, complying with VOC limitations of authorities having jurisdiction.
  - 1. Basis of Design Product: ZRC Galviline Galvanizing Repair Compound cold galvanizing compound of 95% metallic zinc or a comparable product of an approved manufacturer.
- Q. Epoxy Zinc-Rich Primer: Compatible with topcoat.
  - 1. Basis of Design Product: Subject to the requirements provide Sherwin-Williams Zinc Clad IV or a comparable approved product of one of the following:
    - a. AkzoNobel; International Paints/Devoe Coatings.
    - b. Benjamin Moore & Co.
    - c. PPG Architectural Finishes, Inc.
- R. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

- S. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## **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. Continuously seal joined members by continuous welds.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. 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.
  - 1. Comply with NOMMA voluntary guidelines for joint finishes; Finish #2 - completely sanded joint, some undercutting and pinholes acceptable.
- E. Provide for thermal expansion/contraction of exterior metal railings and similar linear fabrications exceeding 30 feet in running length; and not closer than 24 inches from corners and intersections.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- I. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

## 2.4 FABRICATED ITEMS

- A. Provide and install items shown on Drawings with anchorage and attachments necessary for installation. The following is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
- B. Bollards: Steel pipe, minimum wall thickness 0.280 inches; concrete filled, crowned cap, as detailed; finish as specified.
  - 1. Bollards in Slab on Grade: Penetration depth below top of slab to equal detailed height; core hole in slab on grade 3 inches larger than bollard diameter, and fill joint at slab with a non-shrink grout; prime paint finish.
  - 2. Color: Paint Safety Yellow or as specified by Owner requirements.
- C. Door Frames for Overhead Door Openings: Steel channel, plate, or angle sections; prime paint finish.
- D. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; hot-dipped galvanized per ASTM A653, Grade G90 finish.
- E. Embed Plates: Fabricate embed plates for casting into concrete, and masonry construction as detailed on Drawings. Weld anchors to plates to provide full transfer of design loads and stresses. Test embed plate assemblies prior to installation under provisions of Section 05 12 00 and Structural Drawings.

## 2.5 FINISHES - STEEL

- A. Unless otherwise recommended by finish coating manufacturer, prepare surfaces to be shop primed in accordance with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning" for exterior items and items indicated to receive zinc-rich primer. For other items, prepare to SSPC-SP 3, "Power Tool Cleaning."
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Prime paint all steel items, unless otherwise specified.
  - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and miscellaneous framing and supports on exterior of building.
  - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- D. Prime Painting: One coat.
  - 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

2. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

## **2.6 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.

### **3.2 PREPARATION**

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **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 indicated on 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, except surfaces to be in contact with concrete.

### **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.

**END OF SECTION 055000**



## **SECTION 061000 - ROUGH CARPENTRY**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SECTION INCLUDES**

- A. Nonstructural dimension lumber framing.
- B. Preservative treated wood materials.
- C. Fire retardant treated wood materials.
- D. Communications and electrical room mounting boards.
- E. Miscellaneous wood nailers, furring, and grounds.

#### **1.3 RELATED REQUIREMENTS**

- A. Section 061600 - Sheathing: Exterior wall sheathing.

#### **1.4 REFERENCE STANDARDS**

- A. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- B. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2024.
- E. PS 1 - Structural Plywood; 2023.
- F. PS 20 - American Softwood Lumber Standard; 2021.

#### **1.5 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate installation of rough carpentry members specified in other Sections.

## **1.6 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and construction panels.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

## **1.8 WARRANTY**

- A. Correct defective work within a two-year period commencing on Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. 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.
  - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
  - 3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Grade Stamps: Provide each piece of lumber and each panel product stamped showing grade and trademark of grading agency under which it is produced.
  - 1. Additional Stamps: Stamped showing specified requirements for fire-retardant and preservative treatments as specified.



## **2.2 DIMENSION LUMBER**

- A. Wood Blocking:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

## **2.3 CONSTRUCTION PANELS**

- A. Exterior Sheathing: Specified in Section 06 16 00 - Sheathing.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Blocking Applications:
  - 1. Backing Plate: Proprietary fire-retardant treated wood blocking:
    - a. ClarkDietrich; Danback Fire-Retardant Treated Wood Backing Plate.
  - 2. Plywood Blocking/Nailers - Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  - 3. Plywood Blocking/Nailers - Other Locations: PS 1, C-D Plugged or better.

## **2.4 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

## **2.5 FACTORY WOOD TREATMENT - GENERAL**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements, and also stamped "Kiln Dried After Treatment" ("KDAT").

2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards, and also stamped "Kiln Dried After Treatment" ("KDAT").

## **2.6 FIRE RETARDANT TREATMENT (FRT)**

- A. Interior Type: AWWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
  1. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
  2. Applications:
    - a. Treat rough carpentry items as indicated .
    - b. Do not use treated wood in applications exposed to weather or where the wood may become wet.

## **2.7 PRESERVATIVE TREATMENT (PT)**

- A. Preservative Pressure Treatment of Lumber Above Grade: AWWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
  1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
  2. Applications:
    - a. Treat lumber exposed to weather.
    - b. Treat lumber in contact with flashing or waterproofing.
    - c. Treat lumber in contact with masonry or concrete.
    - d. Treat lumber less than 18 inches above grade.
    - e. Treat lumber in other locations as indicated.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.

- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.2 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. Provide the following specific nonstructural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Wall paneling and trim.
  - 9. Joints of rigid wall coverings that occur between studs.

### **3.3 INSTALLATION OF CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Install adjacent boards without gaps.
  - 3. Size and Location: As indicated on Drawings or as required for equipment mounting.

### **3.4 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

**3.5 CLEANING**

- A. Do not leave any wood, shavings, sawdust, or similar waste on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION 061000**

## **SECTION 061600 - SHEATHING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Exterior wall sheathing.
- B. Sheathing joint and penetration treatment.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood panels for miscellaneous blocking and mounting boards.
- B. Section 09 29 00 - Gypsum Board: Interior gypsum panels.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of process and factory-fabricated product.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

### **PART 2 PRODUCTS**

#### **2.1 PRESERVATIVE-TREATED PLYWOOD**

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application:
  - 1. Treat items indicated on Drawings.
  - 2. Treat plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

## 2.2 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
  - 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application:
  - 1. Treat plywood indicated on Drawings.

## 2.3 WALL SHEATHING

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1 APA rated sheathing.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: As indicated in drawings.

## **2.4 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide non-corrosive fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

## **2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS**

- A. As recommended by air barrier manufacturer.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. ICC-ES evaluation report for fastener.
- D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### **3.2 WOOD STRUCTURAL PANEL INSTALLATION**

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall and Roof Sheathing:
    - a. Screw to cold-formed metal framing.
    - b. Space panels 1/8 inch apart at edges and ends.

**END OF SECTION 061600**



## **SECTION 062000 - FINISH CARPENTRY**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Finish carpentry items.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Support framing, grounds, and concealed blocking.
- B. Section {id\#244} - {t\#244}: Shop fabricated custom cabinet work.
- C. Section 09 91 23 - Interior Painting: Painting and coating of finish carpentry items.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- B. AWI (QCP) - Quality Certification Program; Current Edition.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- E. NHLA G-101 - Rules for the Measurement and Inspection of Hardwood and Cypress; 2023.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequencing: Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide data for each type of product and finish.
  - 2. Provide instructions for attachment hardware and finish hardware.

- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide the information required by AWI/AWMAC/WI (AWS).
  - 3. Include certification program label.
- D. Samples: Submit two samples of each type of veneer and finish material, 4 x 4 inch in size illustrating wood grain and specified finish.
- E. Samples: Submit two samples of each type of wood trim 12 inch long.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

## **1.6 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this Section with minimum five years of documented experience.
  - 1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.
  - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
  - 3. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide labels or certificates indicating that the work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.
  - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Store finish carpentry items in installation areas. If finish carpentry items must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.
- D. Stack lumber and provide for adequate air circulation within and around stacks and under temporary coverings.
- E. Protect from moisture damage.
- F. Handle materials and products to prevent damage to edges, ends, or surfaces.

## **1.8 FIELD CONDITIONS**

- A. Comply with specified standard and as additionally specified.
- B. Do not deliver finish carpentry items until environmental conditions meet specified requirements for installation areas.
- C. Do not deliver or install finish carpentry items until building is enclosed and weatherproof, wet work in installation areas is complete and nominally dry, and building's environmental control systems are operating and will maintain temperature and relative humidity at designed occupancy levels throughout the remainder of the construction period.
- D. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## **PART 2 PRODUCTS**

### **2.1 FINISH CARPENTRY ITEMS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless otherwise specified for each carpentry item.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

## **2.2 LUMBER AND TRIM MATERIALS**

- A. Hardwood Lumber for Transparent Finish (Stained or Clear) Interior Trim: Maximum moisture content of 6 percent according to ASTM D4442, S4S, of quality suitable for transparent finish.
  - 1. Grading: In accordance with NHLA G-101 Grading Rules; [www.nhla.org](http://www.nhla.org).
  - 2. Matching: Selected for compatible grain and color.
  - 3. Clear hard maple, plain sawn, FAS/F1F; NHLA.
- B. Prefinished Tongue and Groove Planks:
  - 1. Plank Width: 5-1/4 inches.
  - 2. Basis of Design: Nydree Wood Flooring; Natural Maple.

## **2.3 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application; galvanized finish in concealed locations and stainless steel finish in exposed locations.
- C. Concealed Joint Fasteners: Threaded steel.

## **2.4 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming: Softwood lumber of pine or fir species.
- C. Primer: For factory-primed units, manufacturer's recommended primer.
- D. Wood Filler: Solvent base, tinted to match surface finish color.

## **2.5 SITE FINISHING MATERIALS**

- A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

## **2.6 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed finish edges with material of same finish and pattern.
- C. Shop prepare and identify panel components for book match grain matching during site erection.

- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

#### **3.2 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components with finish nails at maximum 8 inch on center.
- E. Install finish carpentry items with minimum number of joints practical, using full length pieces from maximum lengths of lumber available. Do not use individual pieces less than 24 inches long, except where necessary.
  - 1. Stagger joints in adjacent and related standing and running trim.
  - 2. Cope at returns and miter at corners to produce tight-fitting joints with full surface contact throughout the length of joints.
  - 3. Use scarf joints at end-to-end joints.
  - 4. Plane back surfaces of casings as required to provide uniform thickness and flush finished surfaces across joints.
  - 5. Match color and grain across joints.
- F. Install trim after finishing of substrate surfaces is complete.
- G. Pre-drill pilot holes in hardwood carpentry items before fastening to prevent splitting. Securely fasten to prevent warping or movement.

#### **3.3 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

- B. Site Finishing: See Section 09 91 23.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### **3.4 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

### **3.5 PROTECTION**

- A. Protect installed finish carpentry items from damage due to subsequent construction operations.

**END OF SECTION 062000**

## **SECTION 064000 - ARCHITECTURAL WOODWORK**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Specially fabricated cabinet and architectural woodwork units.
- B. Hardware.
- C. Factory finishing.
- D. Preparation for installing utilities.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Support framing, grounds, and concealed blocking.
- B. Section {id\#1259} - {t\#1259}.

#### **1.3 REFERENCE STANDARDS**

- A. AWI (QCP) - Quality Certification Program; Current Edition.
- B. BHMA A156.9 - Cabinet Hardware; 2020.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Field verify critical dimensions and clearances prior to fabrication of woodwork items; assure that field conditions are as required to comply with indicated design requirements.
  - 2. By accurate field measurements before being enclosed, verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork; record measurements on shop drawings.
  - 3. Where field measurements cannot be made without delaying work, establish required dimensions and maintain those dimensions for fabrication of woodwork.
  - 4. Coordinate construction to ensure that actual dimensions correspond to established required dimensions.
  - 5. Coordinate cabinet spacing and clearances to ensure that doors and drawers do not conflict with each other.

6. Coordinate cabinet opening and spacing requirements with approved appliances and plumbing fixtures.

B. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

## **1.5 SUBMITTALS**

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.

2. Provide the information required by AWI/AWMAC/WI (AWS).

3. Shop drawings are required to be generated as separate digital drawings specific to this Project, not utilizing Architect's digital drawing files in any manner.

4. Show all adjacent construction including abutting walls, columns and similar elements affecting woodwork installation.

5. Include certification program label.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural woodwork construction, minimum 12 inches square, illustrating each proposed cabinet and woodwork substrate and finish.

E. Samples: Submit actual sample items of proposed pulls, hinges, locksets, and all other hardware, demonstrating hardware design, quality, and finish.

F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

## **1.6 QUALITY ASSURANCE**

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.

2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

3. Single Source Responsibility: Provide and install this work from single fabricator.

B. Quality Certification:



1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
6. Replace, repair, or rework all work for which certification is refused.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver woodwork items to installation areas only after clean, well ventilated, and temperature-controlled installation areas are available. Do not deliver woodwork items to installation areas until painting and similar operations are complete in those areas.
- B. Protect units from moisture and impact damage during transit, delivery, and storage; use protective covers during delivery, storage, and handling operations.

#### **1.8 FIELD CONDITIONS**

- A. During and after installation of woodwork, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Single Source Responsibility: Provide and install this work from single fabricator.

#### **2.2 CABINETS**

- A. Quality Standard: Grades as indicated, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets:
  1. Aesthetic Grade: Custom Grade.

2. Performance Grade: Duty Level 2 - Commercial.
3. Exposed Surfaces: High-pressure decorative laminate, type as indicated.
4. Semi-Exposed Surfaces: High-pressure decorative laminate, type as indicated.
5. Concealed Surfaces: Manufacturer's option.

C. Cabinets:

1. Casework Construction Type: Type A - Frameless.
2. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
3. Layout for Cabinet and Door Fronts: Flush panel.
4. Adjustable Shelf Loading: 50 lbs. per sq. ft.
  - a. Deflection: L/144.

## 2.3 WOOD-BASED COMPONENTS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- C. Wood fabricated from old growth timber is not permitted.

## 2.4 LAMINATE MATERIALS

- A. Acceptable Manufacturers:
1. As indicated in Drawings.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as follows:
1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as indicated, finish as indicated.

2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as indicated, finish as indicated.
3. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, through color, colors as indicated, finish as indicated.
4. Post-Formed Vertical Surfaces: VGP, 0.028 inch nominal thickness, through color, colors as indicated, finish as indicated.
5. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as indicated, finish as indicated.
6. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

## **2.5 COUNTERTOPS**

- A. Countertops are specified in Section {id#1259}.

## **2.6 ACCESSORIES**

- A. Adhesive: Type recommended by AWI/AWMAC to suit application.
- B. Edge Banding: Cap exposed edges with material of same finish and pattern.
- C. Fasteners: Size and type to suit application.
- D. 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 or chrome-plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Standard plastic or rubber grommets for cut-outs, in color to match adjacent surface.

## **2.7 HARDWARE**

- A. Hardware: BHMA A156.9, types as indicated for quality grade specified, unless otherwise specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Drawer and Door Pulls: European-style bar pulls, satin chrome finish, 4 inch centers.
- D. Cabinet Locks: Keyed cabinet-grade lock, two keys per lock, finish to match pull finish.

1. Keying: Coordinate with Owner's standard keying system.
- E. Drawer Slides:
1. Type: Full extension.
  2. Static Load Capacity: Commercial grade.
  3. Mounting: Side mounted.
  4. Stops: Integral type.
  5. Finish: Selected from manufacturer's standard line.
  6. Features: Provide self-closing/stay-closed/soft-close type.
  7. Acceptable Manufacturers:
    - a. Accuride International, Inc.: [www accuride.com](http://www accuride.com).
    - b. Grass America Inc: [www.grassusa.com/#sle](http://www.grassusa.com/#sle).
    - c. Hettich America, LP: [www.hettich.com/sle](http://www.hettich.com/sle).
    - d. Knappe & Vogt Manufacturing Company: [www.knappeandvogt.com/#sle](http://www.knappeandvogt.com/#sle).
    - e. Substitutions: See Section 016000 - Product Requirements.
- F. Hinges: European style concealed, self-closing type, steel with satin finish.
1. Provide self-closing/stay-closed/soft-close type.
  2. At 90 degree inside corner conditions, provide restriction clips to limit the opening of cabinet doors to no more than 86 degrees to prevent damage to adjacent surfaces.
  3. Acceptable Manufacturers:
    - a. Grass America Inc.: [www.grassusa.com](http://www.grassusa.com).
    - b. Hardware Resources: [www.hardwareresources.com/#sle](http://www.hardwareresources.com/#sle).
    - c. Hettich America, LP: [www.hettich.com/sle](http://www.hettich.com/sle).
    - d. Blum, Inc.: [www.blum.com](http://www.blum.com).
    - e. Substitutions: See Section 016000 - Product Requirements.
- G. Cabinet Door Restraints: Stainless steel cable type with screw attachment from cabinet frame to cabinet door to reduce the swing of cabinet doors.
1. Required Locations: As an alternative to restriction clips, install door restraints.

2. Manufacturers:
  - a. Hafele; Door Restraint Kit: [www.hafele.com](http://www.hafele.com).
  - b. Substitutions: See Section 016000 - Product Requirements.

## **2.8 FABRICATION**

- A. Assembly: Shop assemble woodwork for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
- E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify critical clearances and dimensions prior to installation of woodwork items.

### **3.2 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure cabinets/woodwork in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe woodwork abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets and woodwork to floor using appropriate angles and anchorages.

- G. Secure full height cabinets, shelving units, and similar casework items exceeding 60 inches in height to floor using appropriate angles and anchorages.
- H. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

### **3.3 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

### **3.4 CLEANING**

- A. Clean woodwork, casework, counters, shelves, hardware, fittings, and fixtures.

### **3.5 PROTECTION**

- A. Protect installed cabinets and woodwork from damage due to subsequent construction operations.

**END OF SECTION 064000**

## **SECTION 068316 - FIBERGLASS REINFORCED PANELING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fiberglass reinforced plastic panels.
- B. Accessories and trim.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2023, with Editorial Revision.
- B. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor; 2013a.
- C. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- D. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2022.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- F. ISO 846 - Plastics - Evaluation of the Action of Microorganisms; 2019.
- G. ISO 2812-1 - Paints and Varnishes -- Determination of Resistance to Liquids -- Part 1: Immersion in Liquids Other than Water; 2017.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - 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.
- C. Samples: Submit two samples 4 by 4 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.

## **1.5 PROJECT CONDITIONS**

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

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers - Panels:
  - 1. Crane Composites, Inc.: [www.cranecomposites.com](http://www.cranecomposites.com).
  - 2. Glasteel: [www.glasteel.com](http://www.glasteel.com).
  - 3. Kemlite: [www.kemlite.com](http://www.kemlite.com).
  - 4. Marlite, Inc.: [www.marlite.com/#sle](http://www.marlite.com/#sle).
  - 5. Nudo Products, Inc.: [www.nudo.com/#sle](http://www.nudo.com/#sle).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.

### **2.2 PANEL SYSTEMS**

- A. Wall Panels:
  - 1. Panel Size: As indicated on Drawings.
  - 2. Panel Thickness: 0.09 inch.
  - 3. Surface Texture: As scheduled.
  - 4. Color: As scheduled.
  - 5. Attachment Method: Adhesive only, with trim and sealant in joints.

### **2.3 MATERIALS**

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
  - 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. Scratch Resistance: Barcol hardness score greater than 35, when tested in accordance with ASTM D2583.



4. Impact Strength: Greater than 6 ft lb force per inch, when tested in accordance with ASTM D256.
  5. Chemical Cleanability: Excellent chemical resistance to common cleaners and detergents when tested in accordance with ISO 2812-1.
  6. Biological Resistance: Rating of 0, when tested in accordance with ISO 846.
- B. Trim: Vinyl; color coordinating with panel.
  - C. Adhesive: Type recommended by panel manufacturer.
  - D. Sealant: Silicone; color matching panel.

### **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 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. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- E. Install panels with manufacturer's recommended gap for panel field and corner joints.
- F. Place trim on panel before fastening edges, as required.
- G. Fill channels in trim with sealant before attaching to panel.
- H. Install trim with adhesive and screws or nails, as required.
- I. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- J. Remove excess sealant after paneling is installed and prior to curing.

#### **3.3 CLEANING**

- A. Remove excess sealant materials from finish surfaces and clean as recommended by panel manufacturer.

**3.4 PROTECTION**

- A. Protect installed materials from damage due to subsequent construction operations.

**END OF SECTION 068316**

## **SECTION 072100 - THERMAL INSULATION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. XPS board insulation at perimeter foundation wall and exterior wall behind indicated wall cladding systems.
- B. Polyisocyanurate board continuous wall insulation behind cladding systems.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024.
- F. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

#### **1.4 QUALITY ASSURANCE**

- A. Thicknesses specified are for the thermal conductivity (k-value at 75 degrees F) specified for each material. Provide adjusted thicknesses for approved use of substituted materials with different thermal conductivity ratings. Where insulation is specified to have a specific "R" value, furnish manufacturer's standard thickness required to equal or exceed the specified value.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.
- B. Protect plastic insulation from exposure to direct sunlight.
- C. Do not deliver plastic insulation materials to the project site ahead of time of installation. Protect at all times against ignition. Complete the installation and concealment of plastic materials as soon as possible in each area of work.

#### **1.6 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

### **PART 2 PRODUCTS**

#### **2.1 APPLICATIONS**

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- B. Continuous Wall Insulation: Polyisocyanurate board.
- C. Miscellaneous Insulation in Framed Construction: Batt insulation with no vapor retarder.

#### **2.2 INSULATION MATERIALS**

- A. Where units are included in fire rated wall, ceiling, or floor construction, provide insulation units which have been tested and rated as required for the indicated assembly.

#### **2.3 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
  - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
  4. Complies with fire resistance requirements specified as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  5. Board Thickness: As indicated on Drawings.
  6. Board Edges: Square.
  7. Water Absorption for Insulation Materials in Ground Contact: Type IV, 0.3 percent by volume, maximum, by total immersion, when tested in accordance with ASTM C272.
  8. Acceptable Manufacturers:
    - a. Dow Chemical Company; STYROFOAM Extruded Polystyrene Insulation (XPS): [www.dow.com/#sle](http://www.dow.com/#sle).
    - b. Kingspan Insulation LLC; GreenGuard GG25-LG XPS Insulation Board: [www.kingspan.com/#sle](http://www.kingspan.com/#sle).
    - c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
1. Classifications:
    - a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
      - 1) Class 2 - Faced with coated glass fiber mat facers on both major surfaces of core foam.
      - 2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 2 - 8.0 (1.41), minimum, at 75 degrees F.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

4. Comply with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
5. Board Size: 48 inch by 96 inch.
6. Board Thickness: As indicated in Drawings.
7. Board Edges: Square.
8. Products:
  - a. Atlas Roofing Corporation: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
  - b. Carlisle Coatings & Waterproofing, Inc: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
  - c. DuPont de Nemours, Inc: [www.building.dupont.com/#sle](http://www.building.dupont.com/#sle).
  - d. GAF: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  - e. Hunter Panels: [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
  - f. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - g. Rmax Inc: [www.rmax.com/#sle](http://www.rmax.com/#sle).
  - h. Substitutions: See Section 016000 - Product Requirements.

## **2.4 BATT INSULATION MATERIALS**

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
  1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Thermal Resistance: As indicated in Drawings.
  5. Facing: Provide the following types:
    - a. Facing: Unfaced.
  6. Acceptable Manufacturers:
    - a. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).

- c. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

## **2.5 ACCESSORIES**

- A. Insulation Fasteners: Appropriate for purpose intended and approved by insulation manufacturer.
  - 1. Length as required for thickness of insulation material and penetration of structural backing or framing as indicated, with metal or plastic washers.
  - 2. Acceptable Manufacturers:
    - a. Hilti: [www.hilti.com](http://www.hilti.com).
    - b. Trufast: [www.trufast.com](http://www.trufast.com).
    - c. McMaster-Carr: [www.mcmaster.com](http://www.mcmaster.com).
- B. Protection Board for Below Grade Insulation: Wood fiberboard, 1/4 inch thick.
- C. Sprayed Polyurethane Foam Sealant for Miscellaneous Voids: 1- or 2-component, closed cell, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less when tested per ASTM E 84; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- D. Adhesive: Type recommended by insulation manufacturer for indicated applications.

## **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 honeycomb, fins, or irregularities.

### **3.2 INSTALLATION, GENERAL**

- A. Install insulation to maintain continuity of thermal protection to building elements and spaces.

### **3.3 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Install boards as indicated on foundation perimeter.
  - 1. Place boards to maximize adhesive contact.
  - 2. Install in running bond pattern.
  - 3. Butt edges and ends tightly to adjacent boards and to protrusions.

- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.
  - 1. Install boards horizontally from base of foundation to top of insulation.
  - 2. Butt boards tightly, with joints staggered from insulation joints.

### **3.4 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Install corrosion resistant impaling pins or other mechanical insulation retention devices, minimum 6 per board or as otherwise recommended by insulation manufacturer, in accordance with insulation manufacturer's written recommendations.
- B. Exterior Walls Behind Veneers and Claddings: Install boards tight to substrate without gaps between boards on walls.
  - 1. Install in running bond pattern.
  - 2. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Insulation Behind Masonry Veneer: See Section 04 20 00 - Unit Masonry for veneer anchors.

### **3.5 BOARD INSTALLATION USING CLADDING SUPPORT SYSTEMS**

- A. Insulation Between Cladding Support Girts: See Section 074210 for additional installation requirements.
  - 1. Install additional mechanical fasteners as recommended by insulation manufacturer, based on selected cladding support system, to secure insulation tight to sheathing.
- B. Trim insulation neatly to fit spaces and provide a continuous thermal layer.

### **3.6 BATT INSULATION INSTALLATION**

- A. Installation - General:
  - 1. Install insulation at locations indicated and in accordance with manufacturer's instructions.
  - 2. Install in exterior wall, ceiling, and miscellaneous wall and ceiling cavity spaces without gaps or voids. Do not compress insulation.
  - 3. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.



4. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
5. Keep insulation minimum 3 inches from heat emitting devices such as recessed light fixtures, and minimum 2 inches from sidewalls of chimneys and vents.

**3.7 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION 072100**



## **SECTION 072726 - FLUID-APPLIED AIR BARRIERS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fluid-applied air barriers.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 06 16 00 - Sheathing: Substrates requiring prep for air barrier installation.

#### **1.3 DEFINITIONS**

- A. Air Barrier: Airtight barrier made of material that is virtually air impermeable with water vapor permeance as specified, having sealed seams and sealed joints to adjacent surfaces.

#### **1.4 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- B. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.
- C. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).
- D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- G. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

#### **1.5 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:

1. Coordinate the installation with adjacent flashings and weather barriers for compatibility and continuity of those systems.
  2. Coordinate installation of flashings at openings with Sections that specify window, door, and other opening installations.
  3. Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building.
- B. Preinstallation Meeting: Conduct a preinstallation meeting at least two weeks prior to the start of the work of this Section.
1. Agenda shall include quality standards set by approved mock-up, sequence of construction, coordination with substrate preparation, air barrier materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction.
  2. Attendance is required by Contractor, Architect, Installer, and representatives of related trades including covering materials, substrate materials and adjacent materials.

## 1.6 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, limitations, and manufacturer's standard flashing and termination details.
- C. Shop Drawings of Mock-Up: Provide drawings of proposed mock-up showing plans, elevations, large scale details, and air barrier transitions and terminations.
- D. Shop Drawings: Provide drawings of project-specific flashing, termination, and special joint conditions based on manufacturer's standard details; minimum scale 1-1/2 inch equals 1 foot.
  1. Show extent of air barrier assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated, how materials that cover the materials are secured with air-tight condition maintained, and how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.
- E. Compatibility: Submit letter from primary material manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use.
- F. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

- G. Field Test Results: Submit test results for tests described in the Field Quality Control article, including retesting if initial results are not satisfactory.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.
- J. Testing agency qualification statement.

## **1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.
- B. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- D. System Compatibility: Assume responsibility for confirming that weather barrier system components are compatible with each other as a system, and also compatible with substrate surfaces with which they will be in contact, including but not limited to wall and sheathing surfaces, opening materials, other flashings and weather barrier materials, and joint sealants.
  - 1. Assure that system components are compatible as specified prior to preparing and making specified submittals.
  - 2. Assume responsibility for removal of incompatible system components and installation of properly compatible components at no additional cost to Owner regardless of when incompatibility is discovered.
- E. Basis of Design: Specifications are based on primary systems by specified basis of design manufacturer. Primary systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, weight, and performance are minor, and do not detract substantially from the indicated design intent.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Handle materials in accordance with material manufacturer's recommendations.

## **1.9 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.
- B. Do not install air barrier in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.

## **1.10 WARRANTY**

- A. Material Warranty: Provide material manufacturer's standard product warranty, for a minimum five years from date of Substantial Completion.
- B. Installation Warranty: Provide a two (2) year installation warranty from date of Substantial Completion, including all accessories and materials of the air barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of attachment, loss of adhesion and failure to cure properly.

## **PART 2 PRODUCTS**

### **2.1 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)**

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
  - 1. Fluid Applied Air Barrier Membrane:
    - a. Dry Film Thickness (DFT): As recommended by manufacturer for each substrate, having a minimum thickness of 25 mil, 0.025 inch.
    - b. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
    - c. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure B - Water Method, at 73.4 degrees F.
    - d. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 180 days of weather exposure.
    - e. Elongation: 250 percent, minimum, when tested in accordance with ASTM D412.
    - f. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.

- g. Complies with fire resistance requirements shown on the Drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
- h. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
- i. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
- j. Acceptable Products:
  - 1) Carlisle Coatings and Waterproofing, Inc; Fire Resist Barritech-VP: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
  - 2) GCP Applied Technologies; Perm-A-Barrier VPL: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).
  - 3) Henry Company; Air-Bloc 17MR: [www.henry.com/#sle](http://www.henry.com/#sle).
  - 4) Polyglass; VertiWrap VPL: [www.polyglass.com](http://www.polyglass.com).
  - 5) Tremco Commercial Sealants & Waterproofing; ExoAir 230: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - 6) W.R. Meadows, Inc; Air-Shield LMP: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - 7) Substitutions: See Section 016000 - Product Requirements.

## **2.2 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR IMPERMEABLE)**

### **A. Fluid Applied Air and Vapor Barrier:**

- 1. Dry Film Thickness (DFT): As recommended by manufacturer for each substrate, having a minimum thickness of 25 mil, 0.025 inch.
- 2. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
- 3. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F.
- 4. Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M.
- 5. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 days of weather exposure.
- 6. Elongation: 250 percent, minimum, when tested in accordance with ASTM D412.

7. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
8. Complies with NFPA 285 requirements for wall assembly.
9. Seam and Perimeter Tape: As recommended by sheet manufacturer.
10. Acceptable Products:
  - a. Carlisle Coatings and Waterproofing, Inc; Fire Resist Barritech NP: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
  - b. GCP Applied Technologies; Perm-A-Barrier NPL 10: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).
  - c. Henry Company; Air-Bloc 16MR: [www.henry.com](http://www.henry.com).
  - d. Polyglass; VertiWrap NPL: [www.polyglass.com](http://www.polyglass.com).
  - e. Tremco Commercial Sealants & Waterproofing; ExoAir 130: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - f. W.R. Meadows, Inc.; Air-Shield LSR: [www.wrmeadows.com](http://www.wrmeadows.com).
  - g. Substitutions: See Section 016000 - Product Requirements.

### **2.3 ACCESSORIES**

- A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions, and as required for a complete and air-tight installation.
  1. All accessory materials shall have air and water vapor permeance performance matching that of the primary air barrier system.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrate and air barrier materials.
  1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch, nominal thickness.
  2. Elongation: 400 percent, minimum, measured in accordance with ASTM D412.
  3. Peel Adhesion: 28 lb/inch, minimum, when tested in accordance with ASTM D903.
  4. Hydrostatic Head Pressure: Resists head pressure of 57 feet, maximum, when tested in accordance with ASTM D751.
  5. Comply with NFPA 285 requirements for wall assembly.



- C. Primer: As recommended by primary air barrier membrane manufacturer.
- D. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement waived if not installed on roof.
  - 1. Thickness: 40 mil, 0.040 inch, nominal; exception from ASTM D1970/D1970M.
  - 2. Width: 4 inches, minimum.
  - 3. Water Vapor Permeance: Matching that of primary air barrier, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.
- E. Preformed Transition Membrane: Semirigid silicone or polyester composition, tapered edges, tear resistant.
  - 1. Products:
    - a. Dow; DOWSIL Silicone Transition Strip and System: [www.dow.com/#sle](http://www.dow.com/#sle).
    - b. Henry Company; Moistop Corner Shield: [www.henry.com/#sle](http://www.henry.com/#sle).
    - c. Momentive Performance Materials, Inc/GE Silicones; RF100 Reinforcing Fabric: [www.siliconeforbuilding.com/#sle](http://www.siliconeforbuilding.com/#sle).
    - d. Tremco Commercial Sealants & Waterproofing; ProGlaze ETA System 1: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - e. Substitutions: See Section 016000 - Product Requirements.
- F. Stainless Steel Flashing: Flexible flashing with 2 mil, 0.002 inch thick Type 304 stainless steel sheet, 8 mil, 0.008 inch of butyl adhesive and siliconized release liner.
  - 1. Width: 6 inches wide, minimum.
  - 2. Overlap joints at least 2 inches.
  - 3. Products:
    - a. Hohmann & Barnard, Inc.; Mighty-Flash SA Stainless Flashing: [www.h-b.com](http://www.h-b.com).
    - b. Momentive Performance Materials, Inc/GE Silicones; GE Elemax SS Flashing: [www.siliconeforbuilding.com/#sle](http://www.siliconeforbuilding.com/#sle).
    - c. STS Coatings, Inc; Wall Guardian Self Adhering Stainless Steel Flashing: [www.stscoatings.com/#sle](http://www.stscoatings.com/#sle).
    - d. VaproShield, LLC; VAPRO-SS FLASHING: [www.vaproshield.com/#sle](http://www.vaproshield.com/#sle).

- e. York Manufacturing, Inc; York 304 SA: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
  - f. Substitutions: See Section 016000 - Product Requirements.
- G. Liquid Flashing: One part, fast curing, nonsag, elastomeric, gun grade, trowelable.
- H. Thinners and Cleaners: As recommended by material manufacturer.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that surfaces and conditions are ready for work of this section.
- B. Ensure that the following conditions are met:
  - 1. Surfaces are sound, dry, even, and free of excess mortar or other contaminants.
  - 2. Inspect substrates to be smooth without large voids or sharp protrusions.
- C. Verify substrate is visibly dry and free of moisture.
- D. Verify sealants are compatible with membrane proposed for use.
- E. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- F. Do not proceed with this work until unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives, sealants, and air barrier materials in accordance with manufacturer's installation instructions.
- C. Protection from spray-applied materials:
  - 1. Mask and cover adjacent areas to protect from over-spray.
  - 2. Ensure any required foam stop or back up materials are in place to prevent over-spray and achieve complete seal.

#### **3.3 INSTALLATION**

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Fluid-Applied Coatings or Membranes:
  - 1. Prepare substrate in accordance with manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
  - 2. Use flashing to seal to adjacent construction and to bridge joints in coating substrate.
  - 3. Position flashing and transition materials so that membrane overlaps the membrane below by a minimum of 2 inches, unless greater overlap is recommended by the material manufacturer. Ensure membranes are securely sealed onto substrate with roller.
  - 4. Connect air barrier in exterior wall assembly continuously to the air barrier of the roof, to below-grade dampproofing/waterproofing systems, to windows, curtain wall, storefront, louvers, exterior doors, other intersection conditions and transitions from wet cavity to dry cavity.
  - 5. Provide mechanically-fastened, non-corrosive sheet metal back-up supports, preformed transition membranes, or other manufacturer-approved transition materials to span gaps greater than 1/4 inch in substrate plane and to make a smooth transition from one plane to the other.
  - 6. Apply a bead or trowel coat of mastic along top edge of membrane seams at reverse lapped seams, rough cuts, and as recommended by the material manufacturer.
  - 7. Seal top edge of the self-adhered membrane to substrate with termination mastic at end of each working day.
  - 8. Install fluid-applied membrane using equipment and methods recommended by manufacturer, to achieve a dry film thickness as required by the material manufacturer.
- E. Refer to air barrier manufacturer's detail drawings for installation procedures including:
  - 1. Changes in substrate.
  - 2. Control joints.
  - 3. Crack treatments.
  - 4. Inside and outside corners.
  - 5. Penetrations.

6. Rough openings.
  7. Sheathing joints.
- F. Openings and Penetrations in Exterior Air Barriers:
1. Install opening flashings up full height of jambs, at heads, and at sills, lapping a minimum of 5 inches onto air barrier system at sills.
  2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
  3. At openings with nonflanged frames, seal air barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
  4. At head of openings, install flashing under air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
  5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  6. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.
    - a. Seal around all penetrating items, including, but not limited to, knife plates, steel members, pipes and conduit, and cladding support systems, using manufacturer's recommended materials.
  7. Seal all penetrations with sealant or liquid flashing approved by manufacturer. Locations required to be sealed include, but are not limited to, masonry tie penetrations, furring fastener penetrations, and all cladding system penetrations.

### **3.4 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Do not cover installed air barriers until required inspections have been completed.
- C. Obtain approval of installation procedures from air barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- D. Take digital photographs of each portion of installation prior to covering up air barriers.
- E. Provide field testing of installed air barrier system by independent laboratory during the construction process. Perform the following:

1. Membrane Adhesion: Test in accordance with ABAA T0002-2019 using a type II pull tester except that the membrane shall be cut through to separate the material attached to the disc from the surrounding material. Perform test after curing period recommended by the material manufacturer. Record mode of failure and area where the material failed. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met. Where the material manufacturer has not declared a minimum adhesion value for their product/substrate combination, the value shall simply be recorded.
  - a. Building Testing: Perform tests on building at three locations. Perform testing at 10%, 50%, and 70% completion of air barrier installation.
2. Air Barrier Assembly Testing - Bubble Gun: Test in accordance with ASTM E1186.
  - a. Building Testing: Perform three tests on sheathing seams and at each type of bracket, clip, and masonry tie. Perform testing at 10%, 50%, and 70% completion of air barrier installation.
- F. If the testing and/or inspections reveal any defects or deficiencies, promptly remove and replace defective work, and retest until satisfactory results are obtained at no additional cost to the Owner.
- G. Repair air barrier and other materials damaged from field testing.

### **3.5 PROTECTION**

- A. Protect air barrier materials from damage during installation and the remainder of the construction period, according to material manufacturer's written instructions.
- B. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION 072726**



## **SECTION 074113 - METAL ROOF PANELS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Metal roof panel system of preformed steel panels.

#### **1.2 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- 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; 2023.
- D. 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; 2023.
- E. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2010).
- F. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- G. ASTM D4869/D4869M - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing; 2016a (Reapproved 2021).
- H. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).
- I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- J. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005 (Reapproved 2017).
- K. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2018, with Editorial Revision (2019).
- L. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate installation of waterproof membrane over roof sheathing.
  - 2. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
  
- B. Preinstallation Meeting: Convene one week before starting work of this Section.
  - 1. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
  - 2. Review flashings, special details, drainage, penetrations, equipment curbs, and conditions of other construction that affect metal panels.
  - 3. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 4. Review temporary protection requirements for metal panel systems during and after installation.
  - 5. Review procedures for repair of metal panels damaged after installation.

### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
  
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Summary of test results, indicating compliance with specified requirements.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Specimen warranty.
  
- C. 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. Indicate substrates and adjacent work with which the system must be coordinated.



3. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
  4. Include structural analysis signed and sealed by qualified structural engineer, indicating compliance of roofing system to specified loading conditions.
- D. Selection Samples: For each roofing system specified, submit at least 5 color chips representing Architect's designated color range.
- E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
1. Include typical panel joint in sample.
  2. Include typical fastening detail.
- F. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- G. Test Report: Indicate compliance of metal roofing system to specified requirements.
- H. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

#### **1.5 QUALITY ASSURANCE**

- A. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and with at least three years of documented experience.
1. Accredited by IAS in accordance with IAS AC472.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

## **1.7 FIELD CONDITIONS**

- A. Do not install metal roof panels, eave protection membrane or underlayment when surface or ambient air temperatures are below 45 degrees F.

## **1.8 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 30-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- C. Special Warranty: Provide 5-year 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:
  - 1. MBCI; Double Lok.
- B. Other Acceptable Manufacturers:
  - 1. ATAS International, Inc.: [www.atas.com/sle](http://www.atas.com/sle).
  - 2. Berridge Manufacturing Company: [www.berridge.com/#sle](http://www.berridge.com/#sle).
  - 3. Centria: [www.centria.com](http://www.centria.com).
  - 4. Englert, Inc: [www.englertinc.com/#sle](http://www.englertinc.com/#sle).
  - 5. Metal Sales Manufacturing Corporation: [www.metalsales.us.com](http://www.metalsales.us.com).
  - 6. Morin Corporation, A Kingspan Group Company: [www.morincorp.com](http://www.morincorp.com).
  - 7. Petersen Aluminum Corporation: [www.pac-clad.com/sle](http://www.pac-clad.com/sle).
  - 8. Substitutions: See Section 016000 - 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. Dead Loads: Weight of roofing system.
  - b. 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.
4. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

### **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. Steel Panels:
    - a. Zinc-coated steel complying with ASTM A653/A653M; minimum G60 galvanizing.
    - b. Steel Thickness: Minimum 24 gauge, 0.024 inch.
  2. Profile: Double-Lok trapezoidal leg with lapped edges fitted with continuous gaskets.
  3. Texture: Smooth.
  4. Length: Maximum possible length to minimize lapped joints. Where lapped joints are unavoidable, space laps so that each sheet spans over three or more supports.
  5. Width: Panel coverage of 18 inches.
  6. Color: As indicated on Drawings

### **2.4 ATTACHMENT SYSTEM**

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

## 2.5 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.
- C. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturers of dissimilar metals or by fabricator.
- D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before manufacturer fabrication.

## 2.6 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as indicated.
  - 1. Acceptable Products:
    - a. Arkema, Inc; Kynar 500: [www.arkema.com/#sle](http://www.arkema.com/#sle).
    - b. PPG; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).
    - c. Sherwin-Williams Company; Fluropon: [www.coil.sherwin.com/#sle](http://www.coil.sherwin.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.

## 2.7 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
  - 1. See Section 07 62 00 for additional requirements.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish.

- C. Sealants: Elastomeric type containing no oil or asphalt.
  - 1. Seam Sealant: Factory-applied, non-skinning, non-drying type.
  - 2. Color: To match metal panel color where exposed.
- D. Underlayment: High-Temperature, Self-Adhering Type.
  - 1. Thickness: 40 mil (0.040 inch).
  - 2. Sheet Width: 36 inches.
  - 3. Water Vapor Permeance: 0.05 perm, maximum, measured according to ASTM E96/E96M.
  - 4. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
  - 5. Adhesion to Plywood: 5.0 pounds per inch of width, measured according to ASTM D903.
  - 6. Primers, Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  - 7. Acceptable Products:
    - a. ATAS International, Inc.; ATA-Shield.
    - b. Carlisle; WIP 300HT.
    - c. GCP; Ice & Water Shield HT: [www.gcpat.com](http://www.gcpat.com).
    - d. Henry Company; Blueskin PE200 HT.
    - e. Metal-Fab Manufacturing, LLC; MetShield.
    - f. Owens Corning; WeatherLock Metal High Temperature Underlayment.
    - g. Polyguard Products, Inc.; Deck Guard HT: [www.polyguard.com](http://www.polyguard.com).
    - h. VaproShield; SlopeShield Plus SA.
    - i. Substitutions: See Section 01 6000 - Product Requirements.
- E. Fasteners: Manufacturer's recommended stainless steel fasteners.
- F. Snow Guards: Prefabricated, non-corrosive units designed for compatibility with metal roof panels.
  - 1. Type: See Section 133419.

- G. Ventilation Mat, Applied Over Underlayment: Nylon mesh fabric.
  - 1. Thickness: 3/8 inch, nominal.
  - 2. Acceptable Products:
    - a. Advanced Building Products, Inc.; R-Vent: [www.advancedbuildingproducts.com/sle](http://www.advancedbuildingproducts.com/sle).
    - b. Enka Solutions; EnkaMat ASV 7010: [www.enkasolutions.com](http://www.enkasolutions.com).
    - c. Keene Building Products; Viper CDR Vent: [www.keenebuilding.com](http://www.keenebuilding.com).
    - d. Substitutions: See Section 016000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.2 PREPARATION**

- A. Broom clean substrate prior to installation of roofing system.
- 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. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.
- D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.
- 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 metal roof panel manufacturer's instructions and recommendations, as applicable to specific project conditions; securely anchor components of roofing system in place allowing for thermal and structural movement.

1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.
- B. Install specified underlayment on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel and underlayment manufacturer. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches unless otherwise specified by underlayment manufacturer.
- C. Install ventilation mat in accordance with manufacturer's written instructions. Trim ventilation mat around penetrations carefully so as not to damage substrates or membranes. Do not leave ventilation mat exposed for durations exceeding manufacturer's recommended timeframe.
- D. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
1. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  2. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
  3. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
  4. Provide sealant tape or other approved joint sealer at lapped panel joints.
  5. Install sealant or sealant tape at end laps and side joints as recommended by metal roof panel manufacturer.
- E. Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

- F. Snow Guards: Install per manufacturer's written instructions.

### **3.4 CLEANING**

- A. 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.

### **3.5 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. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

**END OF SECTION 074113**



## **SECTION 074210 - CLADDING SUPPORT SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Thermally isolated cladding support systems for support of exterior cladding materials.

#### **1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate construction of wall cladding support system over substrate indicated for proper drainage, flashing, trim, back-up support, soffits, and other related Work.
- B. Preinstallation Meeting: Convene one week before starting work of this Section.
  - 1. Require attendance by all affected installers.
  - 2. Review methods and procedures related to installation, including manufacturer's written instructions.
  - 3. Review flashings, wall cladding details, wall penetrations, openings, and condition of other construction that affects this Work.
  - 4. Review support conditions.
  - 5. Review temporary protection requirements for metal panel systems during and after installation.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit for each type of product indicated; include construction details, material descriptions, dimensions of individual components and profiles, and accessories as necessary for complete fully functioning and assembled system.
  - 1. Include continuous insulation support system attachment methods and required fasteners.
- C. Shop Drawings: Coordinate with shop drawing requirements for attachment systems in each related cladding section and substrate sections such as light gage metal framing.
  - 1. Include seal of Professional Engineer registered in the State in which the Project is located on shop drawings.
- D. Test and Inspection Reports: Submit test and inspection reports on each type of wall cladding/veneer system based on evaluation of comprehensive tests performed by nationally recognized testing agency.

- E. Thermal Calculations: Provide thermal calculations that account for thermal bridging for project specific framing, primary and secondary, and associated fasteners. The resultant performance value should pass project performance requirements.
- F. Structural Calculations: Provide structural calculations, sealed and signed by a professional structural engineer licensed in the State in which the Project is located. Test reports are not an acceptable substitute for calculations. Include the following information:
  - 1. Analysis for applicable loads on framing members and structural back-up.
  - 2. Analysis for applicable loads on fasteners and anchors connecting system to structural back-up.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.4 QUALITY ASSURANCE**

- A. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least five years of documented experience.
  - 1. System Review: Manufacturer to provide engineering assessment based on cladding system design.
- C. Installer: Company specializing in performing work of this section and the following:
  - 1. Install system in strict compliance with manufacturer's installation instructions.
  - 2. Have not less than three years of documented experience.

#### **1.5 MOCK-UP**

- A. Comply with general mock-up requirements specified in Section 014000.
- B. Integrated Mock-up: Install materials in mock-up specified in this and related cladding sections, including subgirts, flashings, trims, hardware, fasteners, and accessories for evaluation of workmanship.
  - 1. Locate where directed.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to site in manufacturer's original unopened containers and packaging with labels clearly identifying product name and manufacturer.

- B. Deliver components and other manufactured items or accessories without damage or deformation.
- C. Storage: Store materials in clean, dry, and level interior areas or outdoor areas for limited duration in accordance with manufacturer's written instructions.
- D. Protect components and auxiliary accessories during transportation, handling, and installation from moisture, excessive temperatures and other construction operations in accordance with manufacturer's written instructions.
- E. Handle components in strict compliance with manufacturer's written instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface, edge or corner damage.

### **1.7 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work in accordance with manufacturer's written installation instructions and warranty requirements.

### **1.8 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. System Warranty: Provide written warranty by manufacturer agreeing to correct defects in manufacturing within a five year period after Date of Substantial Completion.
- C. Provide 2 year installation warranty to cover repair of materials found to be defective as a result of installation error.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURER**

- A. Basis of Design:
  - 1. CLADIATOR; Slotted-Z Girt System: <https://cladiator.com/>
- B. Other Acceptable Manufacturers - Thermal Girt Cladding Support System:
  - 1. Advanced Architectural Products (A2P); SMARTci GreenGirt System [www.smartcisystems.com](http://www.smartcisystems.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- C. Substitutions: See 016000 - Product Requirements.

## 2.2 DESCRIPTION

- A. Attach cladding support system components to exterior sheathing over metal stud framing as indicated in drawings.
  - 1. Coordinate cladding support system with delegated design subcontractor for metal studs.
- B. Install cladding support components vertically on substrate as indicated on drawings in compliance with specified requirements.
- C. Cladding systems are drained back ventilated rainscreens. The system shall be able maintain airflow and water management required for this system.

## 2.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance Requirements: Engage a qualified professional engineer to design and size components to withstand the following load requirements without damage or permanent set.
  - 1. Cladding Dead Loads: As required for each cladding system.
  - 2. Design Loads: Comply with the requirements of ASCE 7 and loads indicated in Structural Drawings.
    - a. Measure performance using test loads equal to 1-1/2 times the design wind loads and with 10 second duration of maximum pressure.
- B. System Thermal Design: Ensure installed insulation and cladding support system, rough opening trim, sub-framing, clips and cladding attachment does not have thermal bridging of framing that creates a continuous metal path from exterior surface of insulation to interior face of insulation.
  - 1. Thermal Performance Test: Provide thermal resistance (R-value) indicated, in compliance with ASTM C1363, corrected to 15 mph outside and still air inside, with installed condition including fastening and joints.
    - a. Provide efficiency of no less than 80 percent, with a maximum temperature differential of 18 degrees F from interior wall surface to interior wall cavity and node locations with a 70 degrees F exterior to interior wall temperature delta.
    - b. Provide finite element analysis of three dimensional simulation of described wall assembly sealed by professional engineer in compliance with performance requirements and exceeding it by at least 3 percent.
- C. Temperature: Comply with structural loading requirements within temperature range of minus 55 degrees F to 180 degrees F.

- D. Fire-Test-Response Characteristics: Provide cladding support support system with fire-test results indicated as determined by test standard indicated and applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
1. Surface Burning Characteristics: In compliance with ASTM E84, for foam insulation, steel fiber reinforced polymer (FRP) and interior surfaces as follows:
    - a. Flame Spread Index (FSI): 25 or less.
    - b. Smoke Developed Index (SDI): 450 or less.
  2. Intermediate Scale Multistory Fire Test: Comply with NFPA 285 and/or IBC acceptance criteria for wall height above grade and fire separation distances, when wall type and other noted conditions require such testing or compliance with requirements as indicated.

## **2.4 CLADDING SUPPORT SYSTEM**

- A. Provide Basis of Design manufacturer's standard thermally broken cladding support system, including all accessories and related components for complete system. Design system to comply with performance requirements.
1. System Depth: As indicated on drawings.
  2. On Center Spacing: As required to meet performance requirements, but not more than 24 inches on center.

## **2.5 ACCESSORIES**

- A. Provide accessories necessary for complete cladding support system including strapping or tie-in brackets and similar items.
- B. Fasteners: Corrosion-resistant, self-tapping and self-drilling screws, bolts, nuts, and other fasteners as recommended by cladding support system manufacturer for project application and meeting performance requirements.
1. Sufficient length to provide solid attachment to structure as required by manufacturer.
  2. Cladding to Cladding Support System: Use fasteners recommended by cladding manufacturer.
  3. Cladding Support System to Metal Stud Wall Framing: Use standard self-tapping metal screws.
  4. DO NOT USE powder, air, or gas actuated fasteners or actuated fastener tools. DO NOT USE impact wrenches when fastening to or from the cladding support system.

- 5. Minimum pull-out capacity unless otherwise required to meet performance requirements: 450 pounds.
- C. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.
- D. Sealants: ASTM C920, elastomeric and compatible with air barrier manufacturer.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, areas of this work, and project conditions with installer present for compliance with requirements for installation tolerances, substrates, cladding support system conditions, and other conditions affecting performance of this Work.
- B. Examine wall framing to ensure that structural support members have been installed within alignment tolerances required by cladding support system manufacturer and at all required locations.
- C. Examine rough-in for components and systems penetrating cladding support system to coordinate actual locations of penetrations relative to cladding support systems joint locations prior to installation.
- D. Verify that mechanical and electrical services for exterior walls have been installed and tested and that adjacent materials and finishes are dry and ready to receive insulation.
- E. Proceed with installation only after wall substrate surfaces have been properly prepared and unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by cladding support manufacturer for achieving best result for substrate under project conditions.
- C. Prepare sub-framing, base angles, sills, furring, and other cladding support system members and provide anchorage in accordance with ASTM C754 for substrate type and wall cladding type in accordance with manufacturer's installation instructions.

#### **3.3 INSTALLATION**

- A. Install cladding support system in accordance with manufacturer's written installation instructions.
- B. Trim insulation neatly to fit spaces, and insulate miscellaneous gaps and voids.

- C. Install cladding support system in compliance with system orientation, sizes, and locations as indicated on drawings.

#### **3.4 TOLERANCES**

- A. Shim and align cladding support system within installed tolerances of 1/4 inch in 20 feet, non-cumulative, level, plumb, and on location lines as indicated.

#### **3.5 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Replace damaged materials prior to Date of Substantial Completion.

**END OF SECTION 074210**





## **SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, supports and anchors to structure, attached to solid backup.
- B. Matching flashing and trim.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#340} - {t\#340}: Metal flashing components integrated with this wall system.
- B. Section 079200 - Joint Sealants: Sealing joints between siding and adjacent construction and at panel joints.

#### **1.3 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2024.
- C. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2023b.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2021).
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:

1. Coordinate with placement of anchors .
  2. Coordinate installation of air and weather barrier seals.
- B. Pre-Installation Meeting: Convene one week before starting work of this Section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
1. Require attendance by the installer and relevant sub-contractors.
  2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
  3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
  4. Review procedures for protection of work and other construction.

## **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
1. Finish manufacturer's data sheet showing physical and performance characteristics.
  2. Storage and handling requirements and recommendations.
  3. Fabrication instructions and recommendations.
  4. Specimen warranty for finish, as specified herein.
- C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
1. Physical characteristics of components shown on shop drawings.
  2. Storage and handling requirements and recommendations.
  3. Installation instructions and recommendations.
  4. Specimen warranty for wall system, as specified herein.
- D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.

1. Indicate substrates and adjacent work with which the wall system must be coordinated.
  2. Include large-scale details of anchorages and connecting elements.
  3. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
- E. Selection Samples: For each finish product specified, submit at least three sample color chips representing manufacturer's custom range of available colors and patterns.
1. Sealant Color: Color to match wall panels.
- F. Verification Samples: For each finish product specified, submit at least three samples, minimum size 12 inch square, and representing actual product in color and texture.
- G. Certificate: Certify that the work results of this section meet or exceed specified requirements.
- H. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
1. With not less than three years of documented experience.
  2. Approved by MCM sheet manufacturer.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this Section.
1. With minimum three years of documented experience.
  2. Approved by wall panel system manufacturer.
- C. Basis of Design: Specifications are based on wall panel types by specified basis of design manufacturer. Wall panel types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in design, composition, and profile are minor, and do not detract substantially from the indicated design intent.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
1. Protect finishes by applying heavy duty removable plastic film during production.

2. Package for protection against transportation damage.
  3. Provide markings to identify components consistently with Drawings.
  4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
1. Store in well ventilated space out of direct sunlight.
  2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
  3. Store at a slope to ensure positive drainage of any accumulated water.
  4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F.
  5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

## **1.8 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion, including defects in water tightness and integrity of seals for insulated metal wall panels.
- C. Correct defective work within a twenty year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design Manufacturer:
  1. Laminators, Inc; Omega Lite Panel, Clip & Caulk System:  
[www.laminatorsinc.com](http://www.laminatorsinc.com).

### **2.2 WALL PANEL SYSTEM**

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
  1. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.

2. Anchor panels to supporting framing without exposed fasteners.
- B. System Materials Compatibility: Provide panel system materials that are compatible with one another under conditions of service and application required, as demonstrated by panel system manufacturer based on testing and field experience.
1. Provide system materials and components manufactured by the accepted system manufacturer; components fabricated by others must be specifically approved for use within the system by the accepted system manufacturer.

## **2.3 PERFORMANCE REQUIREMENTS**

- A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
- B. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
1. Design Wind Pressure: As specified in applicable building code and as indicated in Structural Drawings.
  2. Maximum deflection of perimeter framing member of  $L/175$  normal to plane of the wall; maximum deflection of individual panels of  $L/60$ .
  3. Maximum anchor deflection in any direction of  $1/16$  inch at connection points of framing members to anchors.

## **2.4 PANELS**

- A. Panels:
1. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
  2. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
  3. Fabricate as indicated on Drawings and as recommended by MCM sheet manufacturer.
    - a. Make panel lines, breaks, curves and angles sharp and true.
    - b. Keep plane surfaces free from warp or buckle.

- c. Keep panel surfaces free of scratches or marks caused during fabrication.
4. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

## 2.5 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
  1. Overall Sheet Thickness: 0.236 inch.
  2. Face Sheet Thickness: 0.032 inches, minimum.
  3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
  4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 21.5 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
  5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
  6. Flammability: Self-ignition temperature of 650 degrees F or greater, when tested in accordance with ASTM D1929.

## 2.6 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mils, 0.0009 inch; color and gloss as selected by Architect.
  1. Manufacturers:
    - a. Arkema; Kynar 500: [www.americas.kynar.com](http://www.americas.kynar.com).
    - b. PPG Metal Coatings; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).
    - c. Valspar; Fluropon: [www.valsparcoilextrusion.com/#sle](http://www.valsparcoilextrusion.com/#sle).
    - d. Sherwin-Williams Company; SHER-NAR 5000: [oem.sherwin-williams.com/#sle..](http://oem.sherwin-williams.com/#sle..)

- e. Substitutions: See Section 016000 - Product Requirements.

## **2.7 ACCESSORIES**

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, J-moldings, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
- B. Flashing and Trim: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; refer to Section {id\#340} for additional requirements.
- C. Anchors, Clips and Accessories: Use one of the following:
  - 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
- D. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil dry film thickness per coat.
- E. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
  - 1. Refer to Section {id\#3948} for additional requirements.
- F. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices and attachments.
- G. Continuous Soffit Vent: Linear recessed, 3 inch vent, aluminum, finish to match panel finish.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine dimensions, tolerances, and interfaces with other work.
- B. Examine roughing-in for components and systems penetrating composite metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- E. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.
- F. Starting work within a particular area will be construed as acceptance of surface conditions.

### **3.2 PREPARATION**

- A. Protect adjacent work areas and finish surfaces from damage during installation.

### **3.3 INSTALLATION**

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
  - 1. Shim or otherwise plumb substrates receiving metal composite material panels.
  - 2. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 3. Install flashing and trim as metal composite material panel work proceeds.
  - 4. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 5. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
- E. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- F. Field-fabricate panels to sizes and joint configurations indicated on approved Shop Drawings.



- G. Fabricate panels with sharply cut edges and no displacement of face or backer sheets or protrusion of core. Form panel angles, breaks, corners, lines, and returns to be sharp, true, and free of buckle and/or warp.
- H. Separate dissimilar metals. Use gasket fasteners, isolation shims, isolation tape, underlayments, or other permanent separation materials as recommended by SMACNA where needed to eliminate possibility of electrolytic action between metals.
- I. Where joints are designed for field applied sealant, seal joints completely with specified sealant.
  - 1. Install sealants only when ambient temperature conditions can be maintained at or above 40 degrees F during installation and 48 hours immediately following installation.
- J. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.
- K. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
  - 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- L. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- M. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:

1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

N. Replace damaged products.

1. Exception: Field repairs of minor damage to finishes are permitted only when approved in writing by Architect, panel manufacturer, and fabricator.
2. Field Repairs to Finishes: Using materials and methods sufficient that repairs are not discernible when viewed at distance of 10 feet under all typical light conditions experienced at the project.

### **3.4 CLEANING**

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

### **3.5 PROTECTION**

- A. Protect installed panel system from damage until Date of Substantial Completion.

**END OF SECTION 074213.23**

## **SECTION 076200 - SHEET METAL FLASHING AND TRIM**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Wood nailers for sheet metal work.
- B. Section 077100 - Roof Specialties: Manufactured copings and edge flashings..
- C. Section 077200 - Roof Accessories: Manufactured metal roof curbs and hatches.
- D. Section {id\#3948} - {t\#3948}: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

#### **1.3 REFERENCE STANDARDS**

- A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- B. ASTM B32 - Standard Specification for Solder Metal; 2020.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:

1. Coordinate with roofing work for scheduling installation of counterflashing, rain drainage and similar items related to roofing.
  2. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
  3. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.
  4. Coordinate with the work of Section 07 92 00 for installation of related sealants.
- B. Preinstallation Meeting: Convene one week before starting work of this Section.
1. Require attendance of parties directly concerned with the work of this Section, including those who are required to coordinate with the work, and those who are required to protect the work upon completion.
  2. Review preparation and installation procedures and coordinating and scheduling required with related work.
- C. Sequencing: Do not proceed with installation of flashing and sheet metal work until substrate construction, cants, blocking, reglets, and other construction are ready to receive the work of this Section.

## **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
1. Include identification of material, thickness, weight, and finish for each item and location in Project.
  2. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
  3. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  4. Include details of connections to adjoining work.
  5. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

- D. Samples: Submit two samples 6 x 6 inch in size illustrating each metal finish color.

## **1.6 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

## **1.7 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.
- C. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

## **1.8 WARRANTY**

- A. Correct defective Work within a five year period after Date of Substantial Completion. Defective work includes failure of watertightness or seals.
- B. Provide 20 year manufacturer warranty for prefinished sheet metal materials. Warranty shall include degradation of metal finish.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Sheet Metal Assemblies:
  - 1. Capable of withstanding structural movement and exposure to wind and weather without failure or permanent deformation.
    - a. Design Pressure: Conforming with ASCE 7 or as indicated on structural drawings, whichever is most restrictive.
  - 2. Physically protect building elements and systems from damage that would permit water leakage into building enclosure assemblies under all weather conditions.
- B. Sheet Metal Standards: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## **2.2 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum gage as scheduled, shop pre-coated with PVDF coating.
  - 1. Exposed Coating: PVDF (Polyvinylidene Fluoride) Superior Performance Organic Finish, AAMA 621; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- B. Anodized Aluminum: ASTM B209 (ASTM B209M); minimum gage as scheduled; anodized finish of color as selected.
  - 1. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mils thick.
  - 2. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils thick.
- C. Pre-Finished Aluminum: ASTM B209 (ASTM B209M), minimum gage as scheduled; shop pre-coated with with PVDF coating.
  - 1. Exposed Coating: PVDF (Polyvinylidene Fluoride) Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- D. Stainless Steel: ASTM A240, Type 304 alloy, soft temper, fully annealed, minimum gage and finish as scheduled.
  - 1. Finish: 2D (dull, cold rolled).

## **2.3 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, minimum 12 inches wide, one gage thickness heavier than exposed sheet, and interlocking with exposed sheet.

- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- E. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

## 2.4 SEAMS AND JOINTS

- A. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- B. Non-Moving Seams:
  - 1. For metal greater than 0.040 inch thick, fabricate with butt seams with backup plates, fastened one side (SMACNA Figure 3-3, Type 19); seal with butyl sealant concealed within joint.
  - 2. For metals 0.040 inch thick or less, fabricate with flat-lock seams (SMACNA Figure 3-2, Type 2); treat as follows:
    - a. Prepainted Steel and Aluminum: Form seams and seal with elastomeric sealant. Rivet joints where necessary for strength.
    - b. Unpainted Aluminum (includes mill finish and anodized): Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
    - c. Other Metals: Tin edges to be seamed, form seams, and solder.
- C. Moving Seams:
  - 1. For metal greater than 0.040 inch thick: Form expansion joints of butt seams with backup plates fastened to substrate (SMACNA Figure 3-3, Type 18) with no fasteners exposed through covers. Seal seams with butyl sealant concealed within joints.
  - 2. For metal 0.040 inch thick or less: Form expansion joints of intermeshing hooked flanges (SMACNA Figure 3-2, Type 1), not less than 1 inch deep, filled with butyl sealant concealed within joint.
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
  - 1. Do not solder prepainted metal sheet.

## **2.5 ROOF SHEET METAL FABRICATIONS**

- A. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches, and designed to snap into thru-wall flashing or reglets with lapped joints. Provide spring action pressure at bottom edge against base flashings.
  - 1. Type and Finish: See Sheet Metal Schedule.
- B. Flashings for Metal Roofs: Fabricate miscellaneous metal flashings according to the following SMACNA (ASMM) details or as recommended by roofing manufacturer:
  - 1. Roof Penetrations: Figure 8-1 (pipes and vents).
  - 2. Curb Flashings: Figure 8-2.
  - 3. Ridge Caps: Figure 6-17.
  - 4. Ridge, Rake, and Valley Flashings: Figure 6-7.
  - 5. Eave, Hip, and Cap Flashings: Figure 6-6.
- C. Roof Equipment Support Flashing: Cover raised bases and equipment supports. Fabricate with seamed and soldered joints and corners. Extend flashings over roof base flashings 4 inches minimum, and fold back bottom edge 1/2 inch. Where metal is penetrated for bolt or other fastener connections, use 4 lb sheet lead washers 2 inches larger than fastener hole.
  - 1. Comply with SMACNA (ASMM) Figure 8-11B.
  - 2. Type and Finish: See Sheet Metal Schedule.

## **2.6 WALL SHEET METAL FABRICATIONS**

- A. Openings Flashing: Fabricate head, sill, jamb and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high end dams.
  - 1. Type and Finish: See Sheet Metal Schedule.

## **2.7 ROOF DRAINAGE SHEET METAL FABRICATIONS**

- A. Gutters and Downspouts: Form to profiles and sizes indicated and as required to properly collect and remove water. Fabricate complete with required connection pieces and strap anchors to maintain watertight joints.
- B. Gutters: SMACNA (ASMM) Rectangular profile.
  - 1. Comply with SMACNA (ASMM) Figure 1-12.
- C. Downspouts: Rectangular profile.



1. Downspouts: Comply with SMACNA (ASMM) Figures 1-32.
- D. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- E. Accessories: Profiled to suit downspouts.
  1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
  2. Gutter Supports: Brackets.
  3. Downspout Supports: Brackets.
- F. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
- G. Seal metal joints.

## **2.8 ACCESSORIES**

- A. Fasteners: Non-corrosive type.
  1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  3. Fasteners for Zinc-Coated (Galvanized) and Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
  4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Synthetic Underlayment: Polyethylene or polypropylene sheet.

- D. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
1. Thermal Stability: Stable after testing at 220 deg F; ASTM D 1970.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
  3. Acceptable Products:
    - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Metal-Fab Manufacturing, LLC; MetShield.
    - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
    - f. Polyguard Products, Inc.; Deck Guard HT.
    - g. Substitutions: See Section 016000 - Product Requirements.
- E. Slip Sheet: Rosin sized building paper, 3 lb/100 sq. ft. minimum.
- F. Primer: Zinc chromate type.
- G. Protective Backing Paint: Zinc molybdate alkyd.
- H. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil dry film thickness per coat.
- I. Concealed Sealants: Non-curing butyl sealant.
- J. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- K. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- L. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

- M. Plastic Cement: ASTM D4586/D4586M, Type I.
- N. Solder: ASTM B32; Provide type as described:
  - 1. For Stainless Steel: Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. For Zinc-Coated (Galvanized) Steel: Maximum lead content of 0.2 percent.

## 2.9 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior performance organic finish with minimum 70 percent PVDF fluoropolymer resin by weight, multiple coat, thermally cured finish system.
  - 1. Acceptable Products:
    - a. PPG Metal Coatings; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).
    - b. Sherwin-Williams Company; SHER-NAR 5000: [oem.sherwin-williams.com/#sle](http://oem.sherwin-williams.com/#sle).
    - c. Valspar; Fluropon: [www.valsparcoilextrusion.com/#sle](http://www.valsparcoilextrusion.com/#sle).
    - d. Arkema; Kynar 500: [www.americas.kynar.com](http://www.americas.kynar.com).
    - e. Substitutions: See Section 016000 - Product Requirements.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

### **3.3 UNDERLAYMENT INSTALLATION**

- A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
  - 1. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.
  - 1. Do not use plastic underlayment where metals will be site soldered or where plastic sheet will be in direct contact with metal sheets exposed to solar daytime heating.
- C. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

### **3.4 INSTALLATION - GENERAL**

- A. Comply with SMACNA Architectural Sheet Metal Manual.
- B. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  4. Torch cutting of sheet metal flashing and trim is not permitted.
  5. Do not use graphite pencils to mark metal surfaces.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where concealed flashing and trim will contact wood, ferrous metal, or cementitious construction.
  2. Coat concealed surfaces of aluminum downspout that come into contact with dissimilar metals with two coats of clear lacquer.
  3. Underlayment: Where installing metal directly on cementitious or wood substrates, install underlayment.
- D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
- E. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance, but in no case less than 1-1/4 inches for nails and 3/4 inch for wood screws in wood blocking or sheathing.
- F. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- G. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
  2. Do not use torches for soldering.
  3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
  4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- I. Rivets: Rivet joints where necessary for strength.

### **3.5 ROOF FLASHING INSTALLATION**

- A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Recessed Reglet Flashings and Counterflashings: Insert flashings full depth into recessed reglet. Anchor by mechanical means, including driven wedges of lead or other compatible metal spaced at 12 inches on center. Seal joint with elastomeric sealant specified in Section {id\#3948}.
- C. Surface Mounted Reglet Flashings and Counterflashings: Place surface mounted reglet not less than 9 inches above top of cant strip. Place sealant in preformed groove on back of reglet and on lap before installation. Secure reglet to wall with power driven pins through neoprene washers spaced not less than 16 inches on center. Fill top groove with elastomeric sealant specified in Section {id\#3948}. After roofing is installed, install snap-lock counterflashing.
1. Lap counterflashing end joints minimum 3 inches. Do not solder joints. Provide continuous counterflashings at angles and corners, and lap over roof base flashings minimum 4 inches, unless detailed otherwise.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### **3.6 INSTALLATION - WALL FLASHINGS**

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

### **3.7 INSTALLATION - GUTTERS AND DOWNSPOUTS**

- A. Install as recommended by SMACNA (ASMM). Join lengths with formed seams sealed watertight.
- B. Slope gutters minimum 1/8 inch per foot.
- C. Secure downspouts to wall with steel straps or concealed clamp supports, spaced not more than 8 feet oc. Fasten straps or clamps to building with non-corrosive expansion screws.
- D. Set splash pad under each downspout, unless otherwise indicated to connect to underground drainage system.

### **3.8 INSTALLATION - PRE-FINISHED SHEET METAL**

- A. Take special care in the handling and installation to avoid damage to finish.
- B. Remove protective film from each unit after installation, but not before adjacent construction is complete.
- C. Touch up minor damage or defects to match factory finish. Replace units which are excessively damaged as determined by Architect.

### **3.9 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

### **3.10 SCHEDULE**

#### A. General:

1. Where more than one metal material is scheduled, provide sheet metal as indicated on Drawings or, if not indicated, to match metal material of adjacent wall or roof material.
2. Unless otherwise indicated in drawings, where flashings are adjacent to metal wall and roof panel systems or aluminum glazing system frames, match adjacent metal finish and color.
3. Counterflashing and flashing receivers used in conjunction with premanufactured roof edge flashings shall be premanufactured by manufacturer of roof edge flashings. Other counterflashing and flashing receivers may be either premanufactured or shop fabricated.
4. Thicknesses shown are minimums. Increase thicknesses as required to comply with SPRI testing requirements and SMACNA recommendations and to meet performance requirements.
5. Visible is defined as "able to be seen from normal public areas." Provide factory finished materials in visible locations unless otherwise indicated.

#### B. Counterflashings, Visible:

1. Prefinished Galvanized Steel: 0.0217 inch.
2. Finish: PVDF

#### C. Counterflashings, Concealed:

1. Stainless Steel: 0.0187 inch.
2. Finish: 2D dull annealed.

#### D. Flashing Receivers, Visible:

1. Prefinished Galvanized Steel: 0.0217 inch.
2. Finish: PVDF

#### E. Flashing Receivers, Concealed:

1. Stainless Steel: 0.0187 inch.



2. Finish: 2D dull annealed.
- F. Hanging Gutters with Girth up to 15 inches:
1. Aluminum: 0.032 inch.
  2. Finish: PVDF
- G. Downspouts:
1. Aluminum: 0.032 inch.
  2. Finish: PVDF
- H. Miscellaneous Sheet Metal Fabrications, Trims, Flashings, and Top of Wall Closures, Visible:
1. Aluminum: 0.040 inch thick.
  2. Prefinished Galvanized Sheet Steel: 0.0276 inch.
  3. Finish: PVDF
- I. Openings Flashing in Frame Construction, Visible:
1. Aluminum: 0.025 inch thick.
  2. Prefinished Galvanized Sheet Steel: 0.0217 inch.
  3. Finish: PVDF
- J. Openings Flashing in Frame Construction, Concealed:
1. Stainless Steel: 0.0156 inch.
  2. Finish: 2D dull annealed.
- K. Aluminum Glazing Frame Flashing, Concealed:
1. Stainless Steel: 0.0187 inch.
  2. Finish: 2D dull annealed.
- L. Aluminum Glazing Frame Flashing, Visible:
1. Aluminum: 0.032 inch.
  2. Finish: PVDF
- M. Aluminum Glazing Frame Sill Extensions, Visible:
1. Aluminum: 0.040 inch.

2. Finish: PVDF

N. Equipment Support Cap Flashing, Roof Penetration Flashing, and Umbrella Flashing:

1. Stainless Steel: 0.0187 inch.

2. Finish: 2D dull annealed.

**END OF SECTION 076200**

## **SECTION 079200 - JOINT SEALANTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#462} - {t\#462}: Sealing acoustical and sound-rated walls and ceilings.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- C. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- H. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.
- I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
- J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).
- K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- L. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

## 1.4 SUBMITTALS

- A. See Section 013000 - 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. Backing material recommended by sealant manufacturer.
  - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 5. Substrates the product should not be used on.
  - 6. Substrates for which use of primer is required.
  - 7. Substrates for which laboratory adhesion and/or compatibility testing is required.
  - 8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  - 9. Sample product warranty.
  - 10. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.

- 4. Joint-sealant color.
- G. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- H. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- I. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- J. Executed warranty.

### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
  - 1. Adhesion Testing: In accordance with ASTM C794.
  - 2. Compatibility Testing: In accordance with ASTM C1087.
  - 3. Stain Testing: In accordance with ASTM C1248; for porous substrates only.
  - 4. Allow sufficient time for testing to avoid delaying the work.
  - 5. Deliver sufficient samples to manufacturer for testing.
  - 6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  - 7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- E. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
  - 1. Identification of testing agency.

2. Name(s) of sealant manufacturer's field representatives who will be observing.
3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
  - a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
  - b. Test date.
  - c. Location on project.
  - d. Sealant used.
  - e. Stated movement capability of sealant.
  - f. Test method used.
  - g. Date of installation of field sample to be tested.
  - h. Date of test.
  - i. Copy of test method documents.
  - j. Age of sealant upon date of testing.
  - k. Test results, modeled after the sample form in the test method document.
  - l. Indicate use of photographic record of test.

F. Field Adhesion Test Procedures:

1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.

7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- G. Nondestructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
  2. Repair failed portions of joints.
- H. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inches long.
  2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the 1-inch mark is that distance from the substrate, the test has failed.
  3. If either adhesive or cohesive failure occurs before minimum elongation, take necessary measures to correct conditions and retest; record each modification to products or installation procedures.
  4. Record results on Field Quality Control Log.
  5. Repair failed portions of joints.
- I. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or another applicable method as recommended by manufacturer.

## **1.6 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.
- C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 JOINT SEALANT APPLICATIONS**

#### **A. Scope:**

##### **1. Exterior Joints:**

- a. Seal open joints except open joints indicated on drawings as not sealed, including the following:
  - 1) Wall expansion and control joints.
  - 2) Joints between doors, windows, and other frames or adjacent construction.
  - 3) Joints between different exposed materials.
  - 4) Weather sealing joints identified in manufacturer's standard details.

##### **2. Interior Joints:**

- a. Do not seal interior joints indicated on drawings as not sealed.
- b. Do not seal through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
- c. Seal the following joints:
  - 1) Joints between door frames and window frames and adjacent construction.

##### **3. Do Not Seal:**

- a. Intentional weep holes in masonry.
- b. Joints indicated to be covered with expansion joint cover assemblies.
- c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
- d. Joints where sealant installation is specified in other sections.
- e. Joints between suspended ceilings and walls.

#### **B. Type S - Exterior Joints: Use nonsag nonstaining silicone sealant, unless otherwise indicated.**

- 1. Type B - Bedding sealant at thresholds and sills: Butyl rubber.
- 2. Type Bn - Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.



3. Type Bn - Lap Joints between Manufactured Metal Panels: Butyl rubber, noncuring.
  4. Type Psl - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane sealant.
- C. Type P - Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
1. Type L - Wall and Ceiling Joints in Nonwet Areas: Acrylic emulsion latex sealant.
  2. Type Sm - Joints between plumbing fixtures and adjoining walls, floors, and counters: Mildew-resistant silicone sealant.
  3. Type Sm - Joints between Tile in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant.
  4. Type Esr - Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
  5. Type Psl - Other Floor Joints: Self-leveling polyurethane traffic-grade sealant.
- D. Definitions:
1. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

## **2.2 JOINT SEALANTS - GENERAL**

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors for Concealed Locations: Manufacturer's standard.
- C. Colors for Locations Exposed to View: As selected by Architect from Manufacturer's Full Range.
- D. Custom Color-Matched Colors: Where indicated.

## **2.3 NONSAG JOINT SEALANTS**

- A. Type S - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Non-Staining To Porous Materials: Non-staining to light-colored natural stone, masonry, and marble when tested in accordance with ASTM C1248.
  3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

4. Color: To be selected by Architect from manufacturer's full range.
5. Products:
  - a. Dow; DOWSIL 790 Silicone Building Sealant: [www.dow.com/#sle](http://www.dow.com/#sle).
  - b. Momentive Performance Materials, Inc/GE Silicones; SCS9000 SilPruf NB - Non-Staining Silicone Weatherproofing Sealant: [www.siliconeforbuilding.com/#sle](http://www.siliconeforbuilding.com/#sle).
  - c. Pecora Corporation; Pecora 864 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - d. Sika Corporation; Sikasil WS-295: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
  - e. Tremco Commercial Sealants & Waterproofing; Spectrem 1: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - f. Substitutions: See Section 016000 - Product Requirements.
- B. Type Sm - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
  1. Color: To be selected by Architect from manufacturer's standard range.
  2. Products:
    - a. Momentive Performance Materials, Inc/GE Silicones; SCS1700 Sanitary Sealant: [www.siliconeforbuilding.com](http://www.siliconeforbuilding.com).
    - b. Pecora Corporation; 860: [www.pecora.com](http://www.pecora.com).
    - c. Sika Corporation; Sikasil GP: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
    - d. Dow Corning Corporation; 786-M.
    - e. Tremco Incorporated; Tremsil 200.
- C. Type P - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's standard range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.

5. Products:
  - a. Pecora Corporation; Dynatrol I-XL: [www.pecora.com](http://www.pecora.com).
  - b. Sika Corporation; Sikaflex-1a: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
  - c. Tremco Incorporated; Dymonic FC.
  
- D. Type L - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
  1. Color: To be selected by Architect from manufacturer's standard range.
  2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
  3. Products:
    - a. Momentive Performance Materials, Inc/GE Silicones; RCS20 Acoustical Latex Sealant: [www.siliconeforbuilding.com](http://www.siliconeforbuilding.com).
    - b. Pecora Corporation; AC-20+: [www.pecora.com](http://www.pecora.com).
    - c. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - d. Tremco Commercial Sealants & Waterproofing; Tremflex 834: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - e. BASF Building Systems; Sonolac.
  
- E. Type B - Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
  1. Service Temperature Range: Minus 13 to 180 degrees F.
  2. Products:
    - a. Sherwin-Williams Company; Storm Blaster All Season Sealant: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Pecora Corporation; BC-158.
    - c. Tremco Incorporated; Tremco Butyl Sealant
  
- F. Type Bn - Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.
  1. Products:

- a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: [www.pecora.com/#sle](http://www.pecora.com/#sle).
- b. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
- c. Substitutions: See Section 016000 - Product Requirements.

## 2.4 SELF-LEVELING JOINT SEALANTS

- A. Type Psl - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
  1. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  2. Color: To be selected by Architect from manufacturer's standard range.
  3. Service Temperature Range: Minus 40 to 180 degrees F.
  4. Products:
    - a. Sika Corporation; Sikaflex-1c SL: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
    - b. W. R. Meadows, Inc; POURTHANE SL: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. Tremco Incorporated; Vulkem 45SSL.
    - d. Pecora Corporation; NR-201.
    - e. Substitutions: See Section 016000 - Product Requirements.
- B. Type Esr - Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
  1. Composition: Multicomponent, 100 percent solids by weight.
  2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
  3. Color: To be selected by Architect from manufacturer's standard colors.
  4. Joint Width, Minimum: 1/8 inch.
  5. Joint Width, Maximum: 1/4 inch.
  6. Products:

- a. Adhesives Technology Corporation; CRACKBOND JF-90 HD:  
[www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
- b. Euclid Chemical Company; EUACO 700: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
- c. Mapei; Mapeiflex Joint Sealant EP 90/50: [www.mapei.com/#sle](http://www.mapei.com/#sle).
- d. Substitutions: See Section 016000 - Product Requirements.

## **2.5 ACCESSORIES**

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.
- B. Sealant Backing Rod, Closed-Cell Type: For exterior applications and joints subject to pedestrian or vehicular traffic.
  1. Cylindrical flexible sealant backings complying with ASTM C1330 Type C.
  2. Size: 25 to 50 percent larger in diameter than joint width.
- C. Sealant Backing Rod, Open-Cell Type: For interior applications not subject to pedestrian or vehicular traffic.
- D. Sealant Backing Rod, Bi-Cellular Type: For exterior applications and joints subject to pedestrian or vehicular traffic.
  1. Cylindrical flexible sealant backings complying with ASTM C1330 Type B.
  2. Size: 25 to 50 percent larger in diameter than joint width.
- E. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- F. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- G. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- H. 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.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  - 3. Arrange for sealant manufacturer's technical representative to be present during tests.
  - 4. Record each test on Preinstallation Adhesion Test Log as indicated.
  - 5. If any sample fails, review products and installation procedures, consult manufacturer, or take other measures that are necessary to ensure adhesion; retest in a different location; if unable to obtain satisfactory adhesion, report to Architect.
  - 6. After completion of tests, remove remaining sample material and prepare joints for new sealant installation.

### **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 an 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, except where specific dimensions are indicated.

- 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.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

### **3.4 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- C. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- D. Destructive Adhesion Testing: If there are any failures in first 1,000 linear feet, notify Architect immediately.
- E. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
- F. Repair destructive test location damage immediately after evaluation and recording of results.

**END OF SECTION 079200**





## **SECTION 079513 - EXPANSION JOINT COVER ASSEMBLIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Expansion joint cover assemblies.

#### **1.2 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. UL (DIR) - Online Certifications Directory; Current Edition.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- D. Samples: Submit two samples 6 inch long, illustrating profile, dimension, color, and finish selected.
- E. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design:
  - 1. Construction Specialties, Inc.: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Other Acceptable Manufacturers:
  - 1. BASF Watson Bowman Acme Corporation: [www.wbacorp.com/#sle](http://www.wbacorp.com/#sle).
  - 2. EMSEAL Joint Systems, Ltd: [www.emseal.com/#sle](http://www.emseal.com/#sle).

3. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
4. MM Systems Corp.: [www.mmsystemscorp.com](http://www.mmsystemscorp.com).
5. Balco: [www.balcousa.com](http://www.balcousa.com).
6. Substitutions: See Section 016000 - Product Requirements.

## **2.2 EXPANSION JOINT COVER ASSEMBLIES**

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
  1. Basis of Design Products: Construction Specialties, Inc.
    - a. Exterior Roof Application: BRJW-CF.
    - b. Interior Wall Application: ASM Series.
    - c. Interior Floor Application: DGTR Series.
  2. Joint Dimensions and Configurations: As indicated on Drawings.
  3. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
  4. Joint Cover Styles: As indicated on Drawings.
  5. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
- B. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
  1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

### **3.2 INSTALLATION**

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.

**END OF SECTION 079513**

## SECTION 080671 – DOOR HARDWARE SCHEDULE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding Doors.
  - 3. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical and access control door hardware.
  - 3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
  - 4. Automatic operators.
  - 5. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section “Door Hardware”.
  - 2. Division 08 Section “Automatic Door Operators”.
  - 3. Division 28 Section “Access Control Hardware Devices”.
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, 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."
  - 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 Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer 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.
  - 4. Submittal Sequence: Submit the final 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. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. 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.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service

representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. 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 Conference".

#### 1.5 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

#### 1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

### PART 2 - PRODUCTS

#### 2.1 SCHEDULED DOOR HARDWARE

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

### PART 3 - EXECUTION

#### 3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a

hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
  2. The supplier is responsible for handing and sizing all products.
  3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
  2. Section 08 71 13 – Automatic Door Operators.
  3. Section 28 15 00 – Access Control Hardware Devices.
- C. Manufacturer’s Abbreviations:
1. MK – McKinney
  2. PE – Pemko
  3. MR – Markar
  4. SU – Securitron
  5. RO – Rockwood
  6. RU - Corbin Russwin
  7. RI - RITE Door
  8. AD - Adams Rite
  9. HS – HES
  10. RF – Rixson
  11. NO – Norton
  12. HI – Hiawatha
  13. OT – Other
  14. YA - ASSA ABLOY ACCENTRA

**Hardware Sets**

**Set: 1.0**

Doors: C001-1

2	Continuous Hinge	CFM__SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Concealed Vert Rod Exit	PED5859 PED159 MELR M52 M92 CT6SB	630	RU	087100	⚡
1	Concealed Vert Rod Exit	PED5810 EO MELR M52 M92 CT6SB	630	RU	087100	⚡
3	Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D	RO	084126	
2	Conc Overhead Stop	1-X36	630	RF	087100	
1	Surface Closer	DC6220 (Top Jamb Mount)	689	RU	087100	
1	Automatic Opener	6300 Series	689	NO	087113	⚡
1	Rain Guard	346C TKSP		PE	087100	
1	Gasketing	By Door Supplier		OT		
2	Sweep	3452CNB TKSP		PE	087100	
1	Threshold	253x3AFG MSES25SS		PE	087100	
2	ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1	Wiring Diagram	WD-SYSPK		YA	087100	
1	Card Reader	By Security Integrator		OT		
2	ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
2	Position Switch	DPS-M-BK		SU	087100	⚡
2	Door Switch	505		NO	087100	⚡
1	Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches can be electrically held retracted for open access.
3. ADA access by actuator switch. In locked condition, actuator energized only upon valid card reader presentation.
4. Egress free for immediate exit. ADA egress by actuator switch.
5. REX switch in push rail allows authorized exit without alarm condition.
6. Door position switches monitor open/closed status.
7. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 2.0**

Doors: C001-2

2	Continuous Hinge	CFM__SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡

1 Concealed Vert Rod Exit	PED5859 PED159 MELR M52 M92 CT6SB	630	RU	087100	⚡
1 Concealed Vert Rod Exit	PED5810 EO MELR M52 M92 CT6SB	630	RU	087100	⚡
3 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
2 Pull	RM201 Mtg-Type 12XHD	US32D	RO	084126	
2 Conc Overhead Stop	1-X36	630	RF	087100	
1 Surface Closer	DC6220 (Top Jamb Mount)	689	RU	087100	
1 Automatic Opener	6300 Series	689	NO	087113	⚡
1 Gasketing	By Door Supplier		OT		
2 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
2 ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
2 Position Switch	DPS-M-BK		SU	087100	⚡
2 Door Switch	505		NO	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches can be electrically held retracted for open access.
3. ADA access by actuator switch. In locked condition, actuator energized only upon valid card reader presentation.
4. Egress free for immediate exit. ADA egress by actuator switch.
5. REX switch in push rail allows authorized exit without alarm condition.
6. Door position switches monitor open/closed status.
7. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 3.0**

Doors: 006-2, C003-2

1 Continuous Hinge	CFM_HD1 PT		PE	087100	
1 Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1 Rim Exit Device	PED5257 MELR M52 N957PT M92 CT6SB	630C	RU	087100	⚡



2 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
1 Conc Overhead Stop	1-X36	630	RF	087100	
1 Surface Closer	DC6210 A3	689	RU	087100	
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100	
1 Rain Guard	346C TKSP		PE	087100	
1 Gasketing	303AV TKSP x Head and Jambs		PE	087100	
1 Sweep	3452CNB TKSP		PE	087100	
1 Threshold	253x3AFG MSES25SS		PE	087100	
1 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
1 ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
1 Position Switch	DPS-M-BK		SU	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latch for predetermined time limit. Exit device latch can be electrically held retracted for open access.
3. Egress free for immediate exit.
4. REX switch in push rail allows authorized exit without alarm condition.
5. Door position switch monitor open/closed status.
6. Exit device latch releases (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 4.0**

Doors: 008-2, 016-2, 018-1, 018-2, 018-3, 018-4

2 Continuous Hinge	CFM_HD1 PT		PE	087100	
2 Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1 Mullion	CR972KM x 8'-0"		RU	087100	
1 Rim Exit Device	PED5257 MELR M52 N957PT M92 CT6SB	630C	RU	087100	⚡

1 Rim Exit Device	PED5210 EO M92	630	RU	087100	⚡
3 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
2 Conc Overhead Stop	1-X36	630	RF	087100	
2 Surface Closer	DC6210 A3	689	RU	087100	
2 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100	
1 Rain Guard	346C TKSP		PE	087100	
1 Gasketing	303AV TKSP x Head and Jambs		PE	087100	
2 Sweep	3452CNB TKSP		PE	087100	
1 Threshold	253x3AFG MSES25SS		PE	087100	
2 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
2 ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
2 Position Switch	DPS-M-BK		SU	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches can be electrically held retracted for open access.
3. Egress free for immediate exit.
4. REX switch in push rail allows authorized exit without alarm condition.
5. Door position switches monitor open/closed status.
6. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 5.0**

Doors: 016-3, 017-1, 018-5

1 Hardware	By Door Supplier		OT	
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**Set: 6.0**

Doors: 007, 008-1, 009, 014-2, 015-1, 015-2, 016-1, 017-2, C003-1

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100
1 Storeroom Lock	ML2057 NSA CT6SB	626	RU	087100
1 Keyed Cylinder	Match Existing Key System	US32D	RU	087100

1 Electric Strike	1600-CS-LMS	630	HS	087100	⚡
1 SMART Pac Bridge Rectifier	2005M3		HS	087100	⚡
1 ElectroLynx Adaptor	2004M		HS	087100	⚡
1 Surface Closer	DC6210 (or) DC6200	689	RU	087100	
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100	
1 Wall Stop	406	US32D	RO	087100	
3 Silencer	608-RKW		RO	087100	
1 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
1 Position Switch	DPS-M-BK		SU	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Door normally closed and secure.
2. Authorized access by card reader releasing electric strike. Strike can remain released for open access.
3. Egress free for immediate exit.
4. Electric strike latch bolt switch monitors door open/closed/latched status.
5. Electric strike remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 7.0**

Doors: 014-1

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100	
1 Access Control Mort Lock	IN100-ML20234 MB NSA BIPS CT6SB	626	RU	281500	⚡
1 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	

1 Surface Closer	DC6210 (or) DC6200	689	RU	087100
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100
1 Wall Stop	406	US32D	RO	087100

Notes: Operational Narrative:

1. Door normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit.
3. Egress free for immediate exit.
5. Mortise lock REX switch allows authorized exit without alarm condition.
4. Door position switch installed above lock faceplate and connects to lock electronics monitoring open/closed status.
5. Lockset remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 8.0**

Doors: 001, 002, 003, 004, 005, 006-1

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100
1 Access Control Mort Lock	IN100-ML20234 MB NSA BIPS CT6SB	626	RU	281500 ⚡
1 Keyed Cylinder	Match Existing Key System	US32D	RU	087100
1 Wall Stop	406	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Notes: Operational Narrative:

1. Door normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit.
3. Egress free for immediate exit.
5. Mortise lock REX switch allows authorized exit without alarm condition.
4. Door position switch installed above lock faceplate and connects to lock electronics monitoring open/closed status.
5. Lockset remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 9.0**

Doors: 019

8 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100
1 Electric Power Transfer	EL-CEPT	630	SU	087100 ⚡
1 Flush Bolt	555-24	US26D	RO	087100

1 Flush Bolt	555	US26D	RO	087100	
1 Storeroom Lock	ML2057 NSA CT6SB	626	RU	087100	
1 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
1 Electric Strike	1600-CS-LMS	630	HS	087100	⚡
1 SMART Pac Bridge Rectifier	2005M3		HS	087100	⚡
1 ElectroLynx Adaptor	2004M		HS	087100	⚡
2 Surface Closer	DC6210 A11	689	RU	087100	
2 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100	
2 Silencer	608-RKW		RO	087100	
1 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
1 ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
2 Position Switch	DPS-M-BK		SU	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Door normally closed and secure.
2. Authorized access by card reader releasing electric strike. Strike can remain released for open access.
3. Egress free for immediate exit.
4. Electric strike latch bolt switch monitors door open/closed/latched status.
5. Electric strike remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 10.0**

Doors: C002

2 Continuous Hinge	FM200 8'0 CTP	630	MR	087100	
2 Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
2 Recessed Exit	D3676 LR M1 D3655-02	US32D	RI	081700	⚡

1 Exit Device Trim	3080 03-Square 3	US32D	AD	087100	
3 Keyed Cylinder	Match Existing Key System	US32D	RU	087100	
2 Surface Closer	D-DC-351P9 x Hold Open	EN	RI	081700	
2 Kick Plate	KP-Metal 10" H. x Bevel 4 Edges Countersunk Holes	US32D	HI	087100	
2 Wall Stop	406	US32D	RO	087100	
2 Silencer	608-RKW		RO	087100	
2 ElectroLynx Frame Harness	QC-C1500P		MK	087100	⚡
1 Wiring Diagram	WD-SYSPK		YA	087100	
1 Card Reader	By Security Integrator		OT		
2 ElectroLynx Door Harness	QC-C***P x Length as required		MK	087100	⚡
2 Position Switch	DPS-M-BK		SU	087100	⚡
1 Power Supply	AQD4-8C8R2		SU	087100	⚡

Notes: Operational Narrative:

1. Doors normally closed and secure with the ability to be held open during certain times of the day.
2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches can be electrically held retracted for open access.
3. Egress free for immediate exit.
4. REX switch in push rail allows authorized exit without alarm condition.
5. Door position switches monitor open/closed status.
6. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

**Set: 11.0**

Doors: 010

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100	
1 Privacy Lock	ML2020 NSA V21	626	RU	087100	
1 Surface Closer	DC6210 (or) DC6200	689	RU	087100	
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100	
1 Mop Plate	K1050 4" H. x CSK BEV	US32D	RO	087100	
1 Wall Stop	406	US32D	RO	087100	
3 Silencer	608-RKW		RO	087100	

**Set: 12.0**

Doors: 011

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100	
1 Privacy Lock	ML2020 NSA V21	626	RU	087100	

1 Surface Closer	DC6210 A11	689	RU	087100
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

**Set: 13.0**

Doors: 012, 013

4 Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	087100
1 Pull Plate	BF 110x70C	US32D	RO	087100
1 Push Plate	70C-RKW	US32D	RO	087100
1 Surface Closer	DC6210 A11	689	RU	087100
1 Kick Plate	K1050 10" H. x CSK BEV	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

END OF SECTION 080671





## **SECTION 081113 - 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 RELATED REQUIREMENTS**

- A. Section 087100 - Door Hardware.
- B. Section 088000 - Glazing: Glass for doors, sidelites, and borrowed lites.
- C. Section {id\#4044} - {t\#4044}: Field painting.
- D. Section {id\#4045} - {t\#4045}: Field painting.

#### **1.3 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2024.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. 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; 2023, with Editorial Revision.
- H. 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; 2023.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

- J. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- L. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- M. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- P. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.
- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- R. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate with wall construction for anchor placement.
  - 2. Coordinate installation of hardware.
  - 3. Coordinate installation of glazing.
  - 4. Coordinate installation of electrical connections to electrical hardware items.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - 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; and one copy of referenced standards/guidelines.
- C. Door Schedule: Provide schedule coordinated with numbering on drawings and hardware schedule. Indicate door types and openings receiving electrified hardware.
- D. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- 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.

## **1.6 QUALITY ASSURANCE**

- A. Conform to requirements of ANSI A250.8 - SDI-100, and as supplemented in this Section.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
- C. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: <https://steeldoor.org/sdi-certified/#sle>.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- E. Maintain at project site copies of reference standards relating to installation of products specified.

## **1.7 REGULATORY REQUIREMENTS**

- A. Accessibility: Conform to ADA and applicable building codes.

## **1.8 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.
- C. Inspect hollow metal products upon delivery for damage. Minor damage may be repaired provided refinishing is equal in all respects to new work and is acceptable to Architect; otherwise replace damaged items with new products as specified.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. Curries, an ASSA ABLOY Group company: [www.assaabloydss.com](http://www.assaabloydss.com).
  3. Deansteel Manufacturing, Inc.: [www.deansteel.com](http://www.deansteel.com).
  4. Mesker, dormakaba Group: [www.meskeropeningsgroup.com/#sle](http://www.meskeropeningsgroup.com/#sle).

5. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
6. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).

## 2.2 GENERAL DOOR AND FRAME 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. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Door Edge Profile: Manufacturers standard for application indicated.
5. Typical Door Face Sheets: Flush, unless otherwise indicated on Drawings.
6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on Drawings. Style: 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.
  - a. Prepare doors and frames for hardware in accordance with templates provided under Section 087100 - Door Hardware.
8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
  - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.

- ### 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; where two requirements conflict, comply with the most stringent.

## 2.3 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 2 - Seamless.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
    - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
  2. Door Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
    - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
  4. Door Thickness: 1-3/4 inches, nominal.
  5. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  6. Door Finish: Factory primed and field finished.
- B. 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 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
  2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inches, nominal.

4. Door Finish: Factory primed and field finished.

## **2.4 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile/continuously welded type.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
  2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
  3. Frame Finish: Factory primed and field finished.
  4. Weatherstripping: Separate, see Section 087100.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum, for doors up to 42 inches wide.
  2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum, for doors greater than 42 inches wide.
  3. Frame Metal Thickness: 14 gage, 0.067 inch, minimum, for doors with continuous hinges, regardless of width.
  4. Frame Finish: Factory primed and field finished.
- D. Frames for Wood Doors: Comply with general interior metal frame requirements in accordance with corresponding wood door; minimum 16 gage thickness, unless otherwise indicated.
- E. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- F. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- G. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

## **2.5 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.

## **2.6 ACCESSORIES**

- A. Glazing: As specified in Section 088000.
- B. Glazing Stops at Lites: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws on secure side with non-removable stops on non-secure side.
  - 1. Style: Flush.
- C. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- E. Silencers: Resilient rubber or vinyl, 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.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **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.

### **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. For frame installation, use concealed anchors where possible. Where exposed frame anchors are required, countersink fasteners, fill, and sand smooth.

- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Install door hardware as specified in Section 087100 - Door Hardware.
  - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- E. Touch up damaged factory finishes.

### **3.4 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- 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 081113**



## **SECTION 081416 - FLUSH WOOD DOORS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Flush wood doors; flush configuration; non-rated.

#### **1.2 RELATED REQUIREMENTS**

- A. Section **081416** - Flush Wood Doors.
- B. Section 087100 - Door Hardware.
- C. Section 088000 - Glazing.
- D. Section **081416** - Flush Wood Doors: Field finishing of doors.

#### **1.3 REFERENCE STANDARDS**

- A. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- B. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with door opening construction, door frame and door hardware installation.
  - 2. Coordinate installation of glazing.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Door Schedule: Provide schedule coordinated with numbering on drawings and hardware schedule. Indicate door types and openings receiving electrified hardware.
- D. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- E. Verification Samples: Submit two samples of door veneer, 6 by 6 inch in size illustrating plastic laminate color.
- F. Specimen warranty.

- G. Warranty, executed in Owner's name.

## **1.6 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years of documented experience.
- 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. Obtain all doors of each type specified from a single manufacturer to assure uniformity of appearance and construction.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

## **1.8 WARRANTY**

- A. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers - Wood Veneer Faced Doors:
  - 1. Algoma Hardwoods, Inc.: [www.algomahardwoods.com](http://www.algomahardwoods.com).
  - 2. Haley Brothers: [www.haleybros.com/#sle](http://www.haleybros.com/#sle).
  - 3. Marshfield DoorSystems, Inc.: [www.marshfielddoors.com](http://www.marshfielddoors.com).
  - 4. Oregon Door: [www.oregondoor.com/sle](http://www.oregondoor.com/sle).
  - 5. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  - 6. Substitutions: See Section 016000 - Product Requirements.

B. Acceptable Manufacturers - High Pressure Decorative Laminate Faced Doors:

1. Ampco Products, Inc.: [www.ampco.com](http://www.ampco.com).
2. Oregon Door: [www.oregondoor.com/#sle](http://www.oregondoor.com/#sle).
3. Poncraft Door Co.: [www.poncraft.com](http://www.poncraft.com).
4. VT Industries, Inc.: [www.vtindustries.com](http://www.vtindustries.com).
5. Substitutions: See Section 016000 - Product Requirements.

## 2.2 DOORS

A. Doors: Refer to Drawings for locations and additional requirements.

1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
3. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.
4. Low Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
  - a. Formaldehyde Emission: Not greater than 0.05 mg/m<sup>2</sup>/hr.
  - b. 2 Ethyl-1 Hexanol Emission: Not greater than 3.00 mg/m<sup>2</sup>/hr.
  - c. Total VOC Emission: Not greater than 10.00 mg/m<sup>2</sup>/hr.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.

1. Provide solid core doors at each location.
2. Wood veneer facing for field opaque finish as indicated on drawings.
3. High pressure decorative laminate (HPDL) finish as indicated on drawings.

## 2.3 DOOR AND PANEL CORES

A. General Requirement: Provide door cores fully bonded to stiles and rails.

B. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

1. Particleboard Core Grade: LD-1 or Grade LD-2.

2. At contractor's option, provide doors with structural composite lumber core (SCLC) instead of particleboard cores with mid-rail blocking for doors indicated to receive exit devices.
3. Provide structural composite lumber core (SCLC) at doors with full lite glazing.

## **2.4 DOOR FACINGS**

- A. Veneer Facing for Opaque Finish: MDF or closed-grained hardwood veneer, in compliance with indicated quality standard.
- B. High Pressure Decorative Laminate (HPDL) Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; color(s) as indicated; textured, low gloss finish.
- C. Facing Adhesive: Type II - water resistant.

## **2.5 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores constructed with stiles and rails:
  1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
    - a. Provide solid blocking for other throughbolted hardware.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
  1. Exception: Doors to be field finished.
- F. Provide edge clearances in accordance with the quality standard specified.

## **2.6 ACCESSORIES**

- A. Hollow Metal Door Frames: See Section {id\#369}.
- B. Glazing: See Section 088000.
- C. Glazing Stops - Doors Up to and Including 20-minute Ratings: Aluminum channel shape, butted corners; prepared for countersink style tamper proof screws.
  1. Profile: Flush Bead.

- D. Door Hardware: See Section 087100.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

#### **3.2 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Field-Finished Doors: Trimming to fit is acceptable.
- D. Adjust width of non-rated doors by cutting equally on both jamb edges.
  - 1. Trim maximum of 3/4 inch off bottom edges.
- E. Use machine tools to cut or drill for hardware.
- F. Coordinate installation of doors with installation of frames and hardware.
- G. Coordinate installation of glazing.

#### **3.3 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

#### **3.4 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.
- C. Restore finish on all edges of shop finished doors before installation, if fitting or machining is required on site.

**3.5 SCHEDULE**

- A. Refer to Door and Frame Schedule on the Drawings.

**END OF SECTION 081416**

## SECTION 081700 – INTEGRATED DOOR OPENING ASSEMBLIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

##### A. Section Includes:

1. Integrated door opening assemblies including metal frame, integrated door system with operating hardware, and associated door hardware as specified in this section.
2. Factory fitting and hardware preparation for doors and frames.

##### B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 08 Section "Hollow Metal Doors and Frames" for integrated assembly doors installed in standard hollow metal frames.
3. Division 08 Section "Glazing" for glass view panels in integrated assemblies.
4. Division 08 Section "Automatic Door Operators" for power assisted door operators installed at integrated assembly openings.
5. Division 09 Section "Interior Painting" for field painting integrated assembly doors and frames.
6. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on integrated assembly doors and frames with factory installed electrical knock out boxes.

##### C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
3. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
4. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
5. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
6. ICC/IBC - International Building Code.
7. NFPA 70 - National Electrical Code.
8. NFPA 80 - Fire Doors and Windows.
9. NFPA 101 - Life Safety Code.
10. NFPA 105 - Installation of Smoke Door Assemblies.
11. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
12. CARB – California Air Resources Board.
13. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein to comply with the current version year of the following industry standards:

1. ANSI/BHMA Certified Product Standards, A156 Series.

### 1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including integrated opening assembly construction and installation details, material descriptions, core descriptions, hardware reinforcements, profiles, anchorage, fire resistance rating, operational descriptions and finishes.

B. Door Hardware Schedule: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Include the following information:

1. Type, style, function, size, label, hand, and finish of each door hardware item.
2. Manufacturer of each item.
3. Fastenings and other pertinent information.
4. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
5. Explanation of abbreviations, symbols, and codes contained in schedule.
6. Mounting locations for door hardware.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of door and frames types including dimensioned profiles and metal thicknesses.
3. Locations of reinforcement and preparations for hardware.
4. Details of anchorages, joints, field splices, and connections.
5. Details of accessories.
6. Details of moldings, removable stops, and glazing.
7. Details of conduit and preparations for power, signal, and control systems.
8. Provide all dimensions necessary required to complete recessed pockets.

D. Keying Schedule: Reference Division 08 Section "Door Hardware" for keying requirements.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete integrated assembly installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the installed assemblies and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.



#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project site under provisions Division 01 Section "Product Storage and Handling Requirements". Inspect doors, frames, and hardware with representatives of the supplier to verify shipment is complete and to rectify discrepancies promptly.
  - 1. Integrated door assembly systems to be delivered to the job site complete with necessary screws, miscellaneous parts, instructions, and installation templates. Each package legibly and properly labeled to correspond to the approved Door Schedule.
- B. Furnish integrated door opening assemblies with operating hardware flush to door skin, using protective wrappings and spacers between projecting hardware. Maintain and protect door assemblies using cardboard spacers and protective edge guards along the door edges, to reduce exposure to marring or damage during storage.
- C. Store integrated door opening assemblies in dry and secure area. Do not store electronic access control software, credentials, or accessories at Project site without prior authorization.

#### 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.6 COORDINATION

- A. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.
- B. Electrical Connections: Coordinate the layout and installation of scheduled electrified hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

#### 1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
  - 1. This warranty does not cover defects or damage arising from improper installation, lack of or improper maintenance, improper storage, improper handling, corrosion, erosion, ordinary wear and tear, misuse, abuse, accident, unauthorized service or use with unauthorized RITE Door® products or parts.
  - 2. This warranty is void if any modifications are made to the product, regardless of whether the modification causes or contributes to the alleged defect. All modifications are made at the risk of the party making the modification.

- B. Warranty Periods: Manufacturer's standard written form, with the exceptions noted below, warranting integrated door opening assemblies to be free of defect in material or workmanship under normal use for a period of five (5) years.
  - 1. Hollow Metal Doors: Lifetime.
  - 2. Hinges: Up to twenty-five (25) years based upon model and manufacturer.
  - 3. Continuous Hinges: Ten (10) years.
  - 4. Door Closers: Up to twenty-five (25) years based upon model and manufacturer.
  - 5. Electrical Products (except MLR exit devices): Three (3) years.
- C. Warranty includes the manufacturer, at their sole option, agreeing to repair or replace products or parts found to be defective in material or workmanship according to details contained in the warranty certificate.

## 1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of integrated door opening assemblies.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - 1. Adams Rite Manufacturing (RD) - The RITE Door.
  - 2. Substitutions: Requests for substitutions and product approval for inclusive integrated door opening assembly systems in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.2 STEEL MATERIAL REQUIREMENTS

- A. General:
  - 1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
  - 2. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- B. Hollow Metal Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
  - 1). Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Steel Frames:

Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for openings up to 48 inches in width: Minimum 16 gauge thick steel sheet.
4. Frames for openings 48 inches and wider in width: Minimum 14 gauge thick steel sheet.
5. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
6. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.
7. Provide suitable adjustable type anchors for wall condition, minimum 4 each per jamb.

2.3 DOOR HARDWARE MATERIAL REQUIREMENTS:

- A. Provide a complete integrated door opening assembly, including the installation and adjustment of the latching mechanism within the door construction.
- B. Door hardware to include the following minimum products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3.

1. Hanging Device: Continuous Hinges (geared or pinned), Pocket Pivots, Offset/Intermediate Pivots, or Butt Hinges.
  2. Integrated Locking/Latching Hardware: Exit Devices, Lever Handle Trim, or Flush Push/Pulls.
- C. Integrated exit device hardware to be clean and unobtrusive in design with a minimal bar height of 2-7/16-inches. Push rails not exceed a projection of 1-1/8-inches when in the latched position and be made of heavy duty aluminum extrusion, available in anodized and architectural finishes using metal cladding. Exit device end caps to be of metal construction, and should match the trim cover caps when available.
- D. Push and pull hardware to be clean and unobtrusive in design with a maximum projection of 1/4-inches on pull side and 5/8-inches on the push side. To be used on hollow metal doors only.
- E. Lever handles to be clean and unobtrusive in design with a maximum projection of 3-1/2-inches and match design of similar lever locking hardware furnished on project.
- F. Door hardware may include the following optional products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3:
1. Door Closers: Surface Closer or Pocket Closer.
  2. Accessory Items: Magnetic Holders, Protection Plates, Edge Guards, Astragals, Smoke Seals.

## 2.4 FINISH REQUIREMENTS

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.
- B. HPDL Wrapped: Color and pattern as selected by the architect.
- C. Embossed Wood Grain Pattern: Color and pattern as selected by the architect from the manufacturer's standard range.
- D. Hardware Finishes: As specified in Hardware Sets.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Verify the accuracy of dimensions given to the integrated door opening assembly manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation indicates acceptance of the existing conditions.
- D. Verify power supplies, as required, are available to power electrically operated devices.

### 3.2 INSTALLATION

- A. General: Install integrated door opening assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; integrated locking/latching devices; closing devices; and seals.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 3. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- D. Coordinate installation and interface wiring with fire alarm and smoke detection systems.
- E. Remove or protect furnished hardware accessories, prior to painting or finishing completed after the installation of the hardware accessories.

### 3.3 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

### 3.4 ADJUSTMENT

- A. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Remove and replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.5 CLEANING AND PROTECTION

- A. Protect all door opening assemblies and hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install hardware at the latest possible time frame.
- B. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure integrated door and operating hardware is without damage or deterioration at time of owner occupancy.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer or finish paint.

### 3.6 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain integrated door opening assemblies and hardware.

### 3.7 HARDWARE SETS

- A. The integrated door opening hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

END OF SECTION 081700

## **SECTION 083100 - ACCESS DOORS AND PANELS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Wall- and ceiling-mounted access units.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#4045} - {t\#4045}: Field paint finish.

#### **1.3 REFERENCE STANDARDS**

- A. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate installation with work of other trades, and obtain information on door sizes and exact locations from other trades.
  - 2. Coordinate placement of rough-in openings with Architect in tiled walls and gypsum board ceilings.
  - 3. Coordinate placement of access doors and panels with locations of toilet partitions and urinal screens so that doors or panels are not placed in conflict with partition or screen locations.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Product Schedule: Include types, locations, sizes, latching or locking provisions & other data pertinent to installation.
- D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- E. Project Record Documents: Record actual locations of each access unit.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three 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 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Acudor Products Inc.: [www.acudor.com](http://www.acudor.com).
  - 2. Bauco Access Panel Solutions: [www.accesspanelsolutions.com](http://www.accesspanelsolutions.com).
  - 3. Bilco Company: [www.bilco.com](http://www.bilco.com).
  - 4. J. L. Industries: [www.jlindustries.com](http://www.jlindustries.com).
  - 5. Karp Associates, Inc.: [www.karpinc.com](http://www.karpinc.com).
  - 6. Larsen's Manufacturing Co.: [www.larsensmfg.com](http://www.larsensmfg.com).
  - 7. Milcor by Commercial Products Group of Hart & Cooley, Inc.: [www.milcorinc.com](http://www.milcorinc.com).
  - 8. Substitutions: See Section 01 6000 - Product Requirements.
  
- B. Wall- and Ceiling-Mounted Units: 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. Material: Steel.
  - 2. Style: As indicated.
    - a. Public Areas: Use drywall bead type frame.
    - b. Back of House Areas: Exposed frame.
  - 3. Doors:
    - a. Doors for Non-Fire-Rated Units: Single thickness with rolled or turned in edges, 16 gage minimum thickness.
  - 4. Frames: 16 gauge, 0.0598 inch, minimum thickness.
  - 5. Steel Finish: Primed.
  - 6. Size: Fabricate access door frame assemblies to sizes indicated on drawings or, if not indicated, to smallest size which allows free access to concealed work requiring access. Obtain Architect's approval for rectangular sizes.



- a. Where access to controls, etc. requiring one handed operation within arm's reach is required, provide 8 by 8 inches.
  - b. Where access to controls, etc. requiring two-handed operation or rotation within arm's reach is required, provide 12 by 12 inches.
  - c. Where upper body access is required (such as above ceilings or beyond arm's length) provide 18 by 18 inches.
  - d. Where full body access is required (such as entering a shaft) provide 24 by 24 inches.
7. Hardware:
- a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
  - b. Latch/Lock: Tamperproof tool-operated cam latch.
  - c. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
  - d. 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.
- C. Review access panel locations during wall framing rough-in to confirm location is coordinated with interior wall finishes.

### **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. Adjust hardware and panels for proper operation.
- E. Remove and replace panels that are warped, bowed, or otherwise damaged.

**END OF SECTION 083100**

## **SECTION 083313 - COILING COUNTER DOORS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Non-fire-rated coiling counter doors and operating hardware.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing joints between frames and adjacent construction.
- B. Section 087100 - Door Hardware: Cylinder cores and keys.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design:
  - 1. Overhead Door Company; Model 657: [www.overhaddoor.com](http://www.overhaddoor.com)
- B. Other Acceptable Coiling Counter Door Manufacturers:
  - 1. Alpine Overhead Doors, Inc: [www.alpinedoors.com/#sle](http://www.alpinedoors.com/#sle).
  - 2. Raynor Garage Doors: [www.raynor.com/#sle](http://www.raynor.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.

#### **2.2 COILING COUNTER DOORS**

- A. Coiling Counter Doors, Non-Fire-Rated: Stainless steel slat curtain.
  - 1. Mounting: As indicated on drawings.

2. Slat Profile: Flat.
3. Finish, Stainless Steel: No. 4 - Brushed.
4. Integral Frame and Sill: Stainless steel with minimum 16 gauge frame and 14 gauge sill (counter).
5. Hood Enclosure: Manufacturer's standard; stainless steel.
6. Manual push up operation.
7. Locking Devices: Slide bolt on inside.

## **2.3 MATERIALS**

- A. Curtain Construction: Interlocking, single thickness slats.
  1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  2. Curtain Bottom: Fitted with tube to provide reinforcement and positive contact in closed position; with neoprene or vinyl along bottom edge.
  3. Stainless Steel Slats: ASTM A666, Type 304; minimum thickness 22 gauge, 0.03 inch.
- B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
  1. Stainless Steel Guides: ASTM A666, Type 304, rollable temper.
- C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- D. Lock Hardware:
  1. Slide Bolt: Provide on both-jamb sides, extending into slot in guides.
- E. Roller Shaft Counterbalance: Steel pipe and torsion 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.

## **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.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

### **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 ft straight edge.

### **3.4 ADJUSTING**

- A. Adjust operating assemblies for smooth and noiseless operation.

### **3.5 CLEANING**

- A. Clean installed components.
- B. Remove labels and visible markings.

**END OF SECTION 083313**



## **SECTION 083323 - OVERHEAD COILING DOORS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Overhead coiling doors, operating hardware, exterior, electric operation.
- B. Electrical controls.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing joints between frames and adjacent construction.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate installation of electrical service with Division 26.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, component connections and details, electrical equipment, and accessory components.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.

#### **1.6 WARRANTY**

- A. Correct defective Work within a three year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. C.H.I. Overhead Doors: [www.chiohd.com/#sle](http://www.chiohd.com/#sle).
  - 2. Clopay Building Products: [www.clopaydoor.com/#sle](http://www.clopaydoor.com/#sle).
  - 3. Cornell Iron Works, Inc.: [www.cornelliron.com](http://www.cornelliron.com).
  - 4. The Cookson Company: [www.cooksondoor.com/#sle](http://www.cooksondoor.com/#sle).
  - 5. Overhead Door Corporation: [www.overheaddoor.com](http://www.overheaddoor.com).

### **2.2 COILING DOORS**

- A. Exterior Coiling Doors: Steel slat curtain.
  - 1. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
  - 2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 8.1.
  - 3. Finish: Factory painted, custom color.
  - 4. Guide, Angles: Galvanized steel.
  - 5. Hood Enclosure: Manufacturer's standard; galvanized steel.
  - 6. Electric operation.
  - 7. Mounting: As indicated on drawings.

### **2.3 MATERIALS AND COMPONENTS**

- A. Steel Slats: Corrugated roll formed sheets, minimum thickness, 26 gage, or as otherwise required by manufacturer to comply with door size and wind loading requirements; ASTM A653/A653M galvanized steel sheet.
- B. Guide Construction: Continuous, of profile to retain door in place, mounting brackets of same metal.
- C. Steel Guides: Formed from galvanized steel sheet; thickness and width as required to comply with manufacturer's requirements for door size and wind loading requirements; complying with ASTM A653/A653M.
  - 1. Hot-Dip Galvanizing: Minimum G90 coating, in compliance with ASTM A653/A653M.



- D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
- E. Lock Hardware:
  - 1. For motor operated units, additional lock or latching mechanisms are not required.
- F. 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.

## **2.4 ELECTRIC OPERATION**

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
  - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
  - 1. Mounting: Mounting as required per existing conditions.
  - 2. Motor Enclosure:
    - a. Exterior Coiling Doors: NEMA MG 1, Type 4; open drip proof.
  - 3. Motor Rating: Minimum 1/3 hp; continuous duty.
  - 4. Motor Voltage: 120 volts, single phase, 60 Hz.
  - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  - 6. Controller Enclosure: NEMA 250, Type 4.
  - 7. Opening Speed: 12 inches per second.
  - 8. Brake: Manufacturer's standard type, activated by motor controller.
  - 9. Manual override in case of power failure.
- C. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
  - 1. Surface mounted, at location required by Owner.
  - 2. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.

- D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

### **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.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.
- F. Install enclosure and perimeter trim.

#### **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.

#### **3.5 CLEANING**

- A. Clean installed components.
- B. Remove labels and visible markings.

**END OF SECTION 083323**

## **SECTION 083326 - OVERHEAD COILING GRILLES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Overhead coiling metal grilles and operating hardware; electrically operated.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 087100 - Door Hardware: Cylinder cores and keys.

#### **1.3 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- C. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- D. NEMA MG 1 - Motors and Generators; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, component connections and details, electrical equipment, and other pertinent information.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Manufacturer's Installation Instructions: Indicate installation sequences and procedures, adjustment and alignment procedures.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Conform to applicable code for motor and motor control requirements.
- D. 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.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. C.H.I. Overhead Doors: [www.chiohd.com/#sle](http://www.chiohd.com/#sle).
  - 2. Cornell Iron Works, Inc.: [www.cornelliron.com](http://www.cornelliron.com).
  - 3. The Cookson Company: [www.cooksondoor.com](http://www.cooksondoor.com).
  - 4. Raynor Garage Doors: [www.raynor.com/#sle](http://www.raynor.com/#sle).
  - 5. Wayne-Dalton, a Division of Overhead Door Corporation: [www.waynedalton.com](http://www.waynedalton.com).
  - 6. Overhead Door Corporation: [www.overheaddoor.com](http://www.overheaddoor.com).
  - 7. Substitutions: See Section 016000 - Product Requirements.

### **2.2 GRILLES AND COMPONENTS**

- A. Grille: Aluminum; horizontal bar curtain, coiling on overhead counterbalanced shaft.
  - 1. Finish: Black.
  - 2. Lock Devices: Lock and latch handle on outside.
  - 3. Electric operation.
  - 4. Mounting: As indicated on drawings.
- B. Curtain: Round horizontal bars connected with vertical links.
  - 1. Horizontal Bars: 5/16 inch diameter.
  - 2. Bar spacing: 1-1/2 inch on center.
  - 3. Tube Spacers: 1/2 inch diameter.
  - 4. Spacer spacing: 3-1/4 inch on center.

5. Link spacing: 6 inch on center.
  6. Bar Ends: Provide with nylon runners for quiet operation.
  7. Bottom Bar: Back-to-back angles with tubular resilient cushion.
- C. Guides: Extruded aluminum angles, of profile to retain grille in place with snap-on trim, mounting brackets of same metal.
- D. Hood Enclosure and Trim: Sheet metal; completely covering operating mechanisms; internally reinforced to maintain rigidity and shape.
1. Material: Same metal as grille.
- E. Lock Hardware:
1. Cylindrical Locking Mechanism: Latchset lock cylinder, specified in Section 087100.
  2. For motor operated units, additional lock or latching mechanisms are not required.
  3. Latch Handle: Manufacturer's standard.
- F. 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.

## **2.3 MATERIALS**

- A. Aluminum: ASTM B221 (ASTM B221M).

## **2.4 ELECTRIC OPERATION**

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
1. Provide interlock switches on motor operated units.
- B. Electric Operators:
1. Mounting: Side mounted.
  2. Motor Enclosure:
    - a. Interior Grilles: NEMA MG 1, Type 1; open drip proof.
  3. Motor Rating: 1/3 hp; continuous duty.

4. Motor Voltage: 120 volts, single phase, 60 Hz.
  5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  6. Controller Enclosure: NEMA 250 Type 1.
  7. Brake: Adjustable friction clutch type, activated by motor controller.
  8. Manual override in case of power failure.
  9. Refer to Section 260583 for electrical connections.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
1. 24 volt circuit.
  2. Surface mounted, at interior door jamb.
  3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
    - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- E. Safety Edge: Located at bottom of coiling grill, full width, electro-mechanical sensitized type, wired to stop and reverse grill direction upon striking object, hollow neoprene covered.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that opening sizes, tolerances and conditions are acceptable.

#### **3.2 INSTALLATION**

- A. Install grille unit assembly 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.

- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.
- F. Install enclosure and perimeter trim.

### **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 ft straight edge.

### **3.4 ADJUSTING**

- A. Adjust grille, hardware and operating assemblies for smooth and noiseless operation.

### **3.5 CLEANING**

- A. Clean grille and components.
- B. Remove labels and visible markings.

**END OF SECTION 083326**





## **SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing joints between frames and adjacent construction.
- B. Section 087100 - Door Hardware: Hardware items other than specified in this section.
- C. Section 088000 - Glazing: Glass and glazing accessories.

#### **1.3 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- J. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007.

- K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this Section; require attendance by all affected installers.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Selection Samples: For each color specified, submit at least 5 color chips representing Architect's designated color range.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.
- J. Specimen warranty.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this Section in accordance with AAMA CW-10.

- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

## **1.8 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

## **1.9 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide 20 year manufacturer warranty against excessive degradation of painted exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design:
  - 1. Kawneer North America: [www.kawneer.com](http://www.kawneer.com).
    - a. Interior Frame Series: TriFab VG 451, center set glass.
    - b. Exterior Frame Series: TriFab VG 451T, front set glass.
    - c. Door Style: Wide Stile.
- B. Other Acceptable Manufacturers:
  - 1. Boyd Aluminum: [www.boydaluminum.com/#sle](http://www.boydaluminum.com/#sle).
  - 2. Oldcastle BuildingEnvelope: [www.oldcastlebe.com/#sle](http://www.oldcastlebe.com/#sle).
  - 3. Tubelite, Inc: [www.tubeliteinc.com/#sle](http://www.tubeliteinc.com/#sle).
  - 4. YKK AP America, Inc: [www.ykkap.com/commercial/#sle](http://www.ykkap.com/commercial/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.

### **2.2 ALUMINUM-FRAMED STOREFRONT**

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Finish: Superior performing organic coatings.

- a. Factory finish all surfaces that will be exposed in completed assemblies.
  - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
  - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
2. Finish Color: As selected by Architect from manufacturer's standard range.
  3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
  7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
  8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  9. Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.

### **2.3 PERFORMANCE REQUIREMENTS**

- A. Design Requirements: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
  1. Design Wind Loads: Comply with requirements of applicable code.
  2. Member Deflection: Limit member deflection to L/175 of clear span, 3/4 inch total, or to flexure limit of glass in any direction, whichever is less, with full recovery of glazing materials.

3. Provide reinforced mullion sections as may be required to comply with specified design requirements, for manufacturer's specified system.
- B. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 10 psf.
1. Fastener Heads must be seated and sealed against sill flashing on any fasteners that penetrate through the sill flashing.
- C. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.24 psf pressure differential across assembly.
- D. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
- E. Overall U-factor Including Glazing: 0.40 Btu/(hr sq ft deg F), maximum.

## **2.4 COMPONENTS**

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken at exterior applications, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
  2. Glazing Stops: Flush.
  3. Cross-Section: 2 by 4-1/2 inch nominal dimension.
  4. Corner Assemblies:
    - a. 90-Degree Corners: Manufacturer's standard combination of two pocket corner extrusions.
    - b. Corners Other Than 90 Degrees: Manufacturer's standard varying degree pocket corner extrusions with aluminum sheet metal fillers and closures.
  5. Reinforced Mullions: As required or recommended by manufacturer using manufacturer's standard profile of extruded aluminum with internal reinforcement of steel shaped structural section.
- B. Glazing: See Section 088000.
- C. Swing Doors: Glazed aluminum.
1. Thickness: 2 inches.
  2. Top Rail: 5 inches wide.
  3. Vertical Stiles: 5 inches wide.

4. Bottom Rail: 10 inches wide.
5. Glazing Stops: Manufacturer's standard snap-in glazing stops with gasketing; removable from inside.
6. Finish: Same as storefront.

## **2.5 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Structural Steel Sections: ASTM A36/A36M; shop primed.
- D. Fasteners: Stainless steel.
- E. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness.
- G. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- H. Sealant for Setting Thresholds: Non-curing butyl type.
- I. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
  1. Size gaskets as required by manufacturer of glazing channel frame to provide proper pressure and bite on glazing units.
- J. Glazing Accessories: See Section 088000.

## **2.6 ACCESSORIES**

- A. Reinforcement: Where fasteners screw-anchor into aluminum less than 1/8 inch thick, reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive, pressed-in splined grommet nuts.
- B. Brackets: High-strength aluminum brackets and reinforcements where possible; otherwise provide non-magnetic stainless steel or galvanized steel complying with ASTM A123/A123M.
- C. Bituminous Coatings: Cold-applied asphalt mastic, compounded for 30 mil thickness per coat.

- D. Internal System Sealants and Gaskets: As recommended by manufacturer for use within the framing system for fabrication, assembly, and installation. Use products which will remain permanently elastic, non-shrinking, and waterproof.

## **2.7 FINISHES**

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
  - 1. Manufacturers:
    - a. PPG; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).
    - b. Sherwin-Williams Company; Fluropon: [www.coil.sherwin.com/#sle](http://www.coil.sherwin.com/#sle).
    - c. Arkema; Kynar 500: [www.americas.kynar.com](http://www.americas.kynar.com).
    - d. Substitutions: See Section 016000 - Product Requirements.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **2.8 HARDWARE**

- A. For each door, include weatherstripping.
- B. Door Hardware: As specified in Section 087100, except as specified in this Section.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Reinforce components internally for door hardware .

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

### **3.2 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
  - 1. Install storefronts in accordance with ASTM E2112.
- 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, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight end and back dams.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
- K. Install glass in accordance with Section 088000, using glazing method required to achieve performance criteria.
- L. Install internal system sealants as installation progresses. Seal sill pan splices, end dams, water deflectors, and other components to ensure that proper water weepage paths are established and maintained within the system.
- M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.3 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Location: Limit variation from plane or dimensioned location to 1/8 inch in 12 feet, non-cumulative, and 1/2 inch in overall length of member.

### **3.4 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for general testing and inspection requirements.
- B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.



1. Successful Test Result: No water leakage.
  2. Test Frequency: Minimum 75 square feet for every 10,000 square feet of installed glazing.
  3. Perform a minimum of two tests in each designated area as indicated on drawings.
  4. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

### **3.5 ADJUSTING**

- A. Adjust operating hardware for smooth operation.

### **3.6 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

### **3.7 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION 084113**



## **SECTION 084126 - ALL-GLASS ENTRANCES AND STOREFRONTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. All-glass entrances.
- B. All-glass storefronts.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 087100 - Door Hardware.
- B. Section 088000 - Glazing.
- C. Section {id\#462} - {t\#462}.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this Section to review requirements.
  - 1. Require attendance by representatives of installer and entities effected by adjacent or other work related to this section.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for each component in all-glass entrance assembly.
- C. Shop Drawings: Drawings showing layout, dimensions, identification of components, and interface with adjacent construction.
  - 1. Include field measurements of openings.
  - 2. Include elevations showing:
    - a. Appearance of all-glass entrance layouts.

- b. Locations and identification of manufacturer-supplied door hardware and fittings.
- c. Locations and sizes of cut-outs and drilled holes for other door hardware.
- 3. Include details of:
  - a. Requirements for support and bracing at openings.
  - b. Installation details.
  - c. Appearance of manufacturer-supplied door hardware and fittings.
- 4. Schedule: Listing of each type component in all-glass entrance assemblies, cross-referenced to shop drawing plans, elevations, and details.
- D. Selection Samples: Two sets, representing manufacturer's full range of available metal materials and finishes.
- E. Verification Samples: Two samples, minimum size 2 by 3 inches, representing actual material and finish of exposed metal.
- F. Certificates: Contractor's certification that installer of entrance assemblies meets specified qualifications.
- G. Installer's Qualification Statement.

## **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Minimum three years of experience installing entrance assemblies similar to those specified in this section.
- B. Basis of Design: Specifications are based on entrance and hardware types by specified basis of design manufacturer and product(s). Entrances and hardware types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, weight, and profile are minor, and do not detract substantially from the indicated design intent.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

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

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design Manufacturer:
  - 1. C.R. Laurence Company, Inc.: [www.crl-arch.com/sle](http://www.crl-arch.com/sle).

B. Other Acceptable Manufacturers:

1. ASSA ABLOY Glass Solutions: [www.assaabloydss.com](http://www.assaabloydss.com).
2. Avanti Systems USA, Inc.: [www.avantisystemsusa.com](http://www.avantisystemsusa.com).
3. GGI - General Glass International: [www.generalglass.com/#sle](http://www.generalglass.com/#sle).
4. Dormakaba Group: [www.dormakaba.com](http://www.dormakaba.com).
5. Oldcastle BuildingEnvelope: [www.obe.com](http://www.obe.com).
6. Trulite Glass & Aluminum Solutions, LLC: [www.trulite.com/#sle](http://www.trulite.com/#sle).
7. Substitutions: See Section 016000 - Product Requirements.

## 2.2 ALL-GLASS ENTRANCES AND STOREFRONTS ASSEMBLIES

A. Entrances and Storefronts: Factory fabricated assemblies consisting of frameless glass panels fastened with metal structural fittings in configuration indicated on drawings.

1. Operational Loads: Designed to withstand door operation under normal traffic without damage, racking, sagging, or deflection.
2. Prepared for all specified hardware whether specified in this section or not.
3. Finished metal surfaces protected with strippable film.
4. Factory assembled to greatest extent practicable; may be disassembled to accommodate shipping constraints.

## 2.3 FITTINGS AND HARDWARE

A. Aluminum Frames for Doors: Extruded aluminum hollow or C-shaped sections; no steel components.

1. Frame Depth: 4-1/4 inches, nominal.
2. Aluminum Finish: Custom finish as selected by Architect.

B. Rail Style Fittings for Fixed Glazing:

1. Basis of Design: C.R. Laurence Company, Inc.
  - a. Full Length Top Rails: 2 inch high, square edge.
    - 1) Product: WU2\_\_SL Series.
  - b. Full Length Bottom Rails: 4 inch high, tapered edge.

1) Product: SR4T\_\_3812SL Series.

c. Aluminum Finish: Custom finish as selected by Architect.

## **2.4 MATERIALS**

- A. Glass: See Section 08 80 00 - Glazing.
- B. Aluminum Components: Comply with ASTM B221 (ASTM B221M), Alloy 6063, Temper T5.
- C. Sealant: One-part silicone sealant, comply with ASTM C920, clear.

## **2.5 ACCESSORIES**

- A. Exposed Fittings and Hardware: Extruded aluminum, clear anodized finish.
- B. Door Hardware: Specified in Section 087100.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that openings are acceptable.
- B. Do not begin installation until substrates and openings 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 substrates thoroughly prior to installation.
- B. Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.3 INSTALLATION**

- A. Installation of metal framing for openings as specified in Section {id\#462}.
- B. Install in accordance with manufacturer's installation instructions.
- C. Tolerances:
  - 1. Horizontal Components and Sight Lines: Not more than 1/8 inch in 10 feet variation from level, non-cumulative.
  - 2. Vertical Components and Sight Lines: Not more than 1/8 inch in 10 feet variation from plumb, non-cumulative.

3. Variation from Plane or Indicated Location: Not more than 1/16 inch.

D. Installation of door hardware not supplied by entrance/storefront manufacturer as specified in Section 087100.

**3.4 ADJUSTING**

A. Adjust doors to operate correctly, without binding to frame, sill, or adjacent doors.

B. Adjust door hardware for smooth operation.

**3.5 CLEANING**

A. Clean installed work to like-new condition.

**3.6 PROTECTION**

A. Protect installed products until Date of Substantial Completion.

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

**END OF SECTION 084126**





## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Automatic operators.
- C. Related Sections:
  - 1. Division 08 Section "Hollow Metal Doors and Frames".
  - 2. Division 08 Section "Flush Wood Doors".
  - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
  - 4. Division 08 Section "Automatic Door Operators".
  - 5. Division 28 Section "Access Control Hardware Devices".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
  - 8. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series.

2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, 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."
  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 Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer 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.
  4. Submittal Sequence: Submit the final 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. Shop Drawings: Details of electrified access control hardware indicating the following:
  1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

- a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
  - b. Complete (risers, point-to-point) access control system block wiring diagrams.
  - c. Wiring instructions for each electronic component scheduled herein.
2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. 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.
- E. Informational Submittals:
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.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a 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.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
  
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
  
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
  
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" 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.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' 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.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
  
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. 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 Conference".

## 1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

## 1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- 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. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
  - a. Two Hinges: For doors with heights up to 60 inches.
  - b. Three Hinges: For doors with heights 61 to 90 inches.
  - c. Four Hinges: For doors with heights 91 to 120 inches.
  - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
  - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
  - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
  - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
  - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
  - a. McKinney (MK) - TA/T4A Series, 5-knuckle.

### 2.2 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.
  - a. Pemko (PE).

- B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
- b. Pemko (PE).

## 2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. Securitron (SU) - EL-CEPT Series.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

- a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
- b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney (MK) - QC-C Series.

## 2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

- a. Rockwood (RO).

- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
2. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
3. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. 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.
4. Manufacturers:

- a. Rockwood (RO).

## 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. 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.
6. Keyway: Match Facility Standard.

- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.

- D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.



2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.6 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:
  - a. Lund Equipment (LU).
  - b. MMF Industries (MM).
  - c. Telkee (TK).

## 2.7 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ML2000 Series.

## 2.8 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.9 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:
  - a. HES (HS) - 1500/1600 Series.

- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.10 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. 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 Sets.

5. 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.
  6. 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 Sets, 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 Sets.
  7. 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.
  8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
1. Provide exit devices with functions and features as follows:
    - a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
    - b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
    - c. No catch points: addition of applied deflectors or other added components are not allowed.
    - d. No visible plastic.
    - e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
    - f. Constructed of all stainless steel.
    - g. Stainless steel pullman type latch with deadlock feature.
    - h. Narrow or wide style exterior trim as specified in the hardware sets.
    - i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
    - j. Ten-year limited warranty for mechanical features.
  2. Electromechanical exit devices shall have the following functions and features:
    - a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
    - b. Wire routing for all non-access control electromechanical functions and EcoFlex trim to be contained within the carrier of the device eliminating the need for

cavities in doors to be drilled. Include a protective film so that wires don't get damaged if the rail needs to be removed.

- c. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
- d. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
- e. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.

3. Manufacturers:

- a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.

## 2.11 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be 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.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
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. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. 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 sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty 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 and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - DC6000 Series.

## 2.12 ELECTROMECHANICAL DOOR OPERATORS

- A. Electromechanical Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that are UL325/991 and UL10C certified and comply with requirements for the Americans with Disabilities Act (ADA). Operators shall accommodate openings up to 250 pounds and 48" wide.
1. Provide operators with features as follows:
    - a. Non-handed with push and pull side mounting.
    - b. Activation by push button, hands-free or radio frequency devices.
    - c. Adjustable opening force and closing power.
    - d. Two-year limited warranty.
    - e. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building's IT required.
      - 1) Simple setup with no app required.
      - 2) View status and make adjustments without removing the cover.
      - 3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
    - f. Mounting backplate to simplify and speed up installation.
    - g. Integration with access control systems.
  2. Operators shall have the following functionality:
    - a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
    - b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
    - c. Emergency Interface Relay: Door closes and ignores any activation input until signal is discontinued.
    - d. Infinite Hold Open: Door will hold open at set position until power is turned off.
    - e. Latch Assist: At closed position, after an activation, the door is pulled in. After the door has closed, the door is pulled in to assist with latch release/engagement.
    - f. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
    - g. Open Delay: Delays operator opening for locking hardware.
    - h. Outside Wall Switch Disable: When contact is closed, outside wall switch is disabled.
    - i. Power Assist: Senses the door is being opened manually and applies small amount of power to assist the user in opening the door with force less than 5 lbs. The door opens only as far as it is moved manually, then closes once released.
    - j. Power Close: Additional force to assist door closing between 7° and 2°.
    - k. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
    - l. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.

- m. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
  - n. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.
  - o. Executive Mode Feature: When the door receives an activation signal it opens and remains open until either a second signal is received, or the door is manually moved in closing direction.
3. Manufacturers:
- a. Norton Rixson (NO) - 6300 Series.

## 2.13 ARCHITECTURAL TRIM

### A. Door Protective Trim

- 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
- 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" 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 Sets.
- 3. Where plates are applied to fire rated doors with the top of the plate more than 16" 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.
- 4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, 050-inch thick.
- 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
- 6. Manufacturers:
  - a. Rockwood (RO).

## 2.14 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

- a. Rockwood (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

- a. Norton Rixson (RF).

## 2.15 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).

## 2.16 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing

snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:
  - a. Securitron (SU) - DPS Series.

## 2.17 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.18 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical 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. 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 ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.



### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. 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.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. 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.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  - 1. Quantities listed are for each pair of doors, or for each single door.
  - 2. The supplier is responsible for handling and sizing all products.
  - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION 087100

## **SECTION 088000 - GLAZING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Insulating glass units.
- B. Monolithic glazing units.
- C. Glazing compounds.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealants for other than glazing purposes.
- B. Section 08 41 26 - All-Glass Entrances and Storefronts: Frames and fittings for interior glazing.
- C. Section 08 43 13 - Aluminum-Framed Storefronts: Frames for storefront assemblies.

#### **1.3 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- J. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- K. GANA (GM) - GANA Glazing Manual; 2022.

- L. GANA (SM) - GANA Sealant Manual; 2008.
- M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).
- N. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.
- O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
- P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.
  - 1. Discuss installation requirements and limitations, coordination with other affected installers, and special applications.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data on Each Glazing Type: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Product Test Reports: For coated glass, insulating glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- G. Preconstruction adhesion and compatibility test report.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

## **1.6 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM), GANA (SM), and IGMA TM-3000 for glazing installation methods.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
  - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
  - 1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Provide each type of glass, primary sealant, and gasket from a single manufacturer with not less than five years documented experience in the production of required materials.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's instructions for shipping, handling, storing, and protection of glass and glazing materials. Exercise exceptional care to prevent edge damage to glass, and damage to coatings.

## **1.8 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
- C. Install sealants only when ambient temperature conditions can be maintained at or above 40 degrees F during installation and 48 hours immediately following installation.

## **1.9 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Float Glass Manufacturers:
1. Cardinal Glass Industries: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  2. Guardian Glass, LLC: [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).
  3. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  4. Saint Gobain North America: [www.saint-gobain.com/#sle](http://www.saint-gobain.com/#sle).
  5. Vitro Architectural Glass (formerly PPG Glass): [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  6. Substitutions: See Section 016000 - Product Requirements.

### **2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES**

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Design Pressure: Calculated in accordance with ASCE 7 and requirements in Structural Drawings.
  2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  4. Design glazing units to reliably perform and remain reliably engaged on all edges under all service and thermal stresses, including those associated with partial shading.
  5. Limit center of glass deflection to the lesser of 3/4 inch or L/100 (where L is short side dimension of glass unit), or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  6. Assure and confirm compatibility of all materials in contact with each other.
  7. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.

1. In conjunction with weather barrier related materials described in other sections, as follows:
    - a. Air Barriers: See Division 07
  2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
  3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  3. Solar Optical Properties: Comply with NFRC 300 test method.

## **2.3 GLASS MATERIALS**

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
  5. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category II criteria.
  6. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

## **2.4 INSULATING GLASS UNITS**

- A. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- B. Insulating Glass Units - General: Types as indicated.

1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
  4. Spacer Color: Black.
  5. Edge Seal:
    - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
    - b. Color: Black.
  6. Purge interpane space with dry air, hermetically sealed.
- C. Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with argon.
  3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
    - b. Coating: Low-E (passive type), on #2 surface.
      - 1) Basis of Design: SunGuard 62/27.
  4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  5. Total Thickness: 1 inch.
  6. Thermal Transmittance (U-Value): 0.25, nominal.
  7. Visible Light Transmittance (VLT): 62 percent, nominal.
  8. Solar Heat Gain Coefficient (SHGC): 0.26, nominal.
  9. Glazing Method: Dry glazing method, gasket glazing.
- D. Insulating Glass Units: Safety glazing.



1. Applications:
  - a. Glazed lites in exterior doors.
  - b. Glazed sidelights and panels next to doors.
  - c. Other locations required by applicable federal, state, and local codes and regulations.
  - d. Other locations indicated on drawings.
2. Space between lites filled with argon.
3. Glass Type: Same as typical exterior glazing type except use fully tempered float glass for both outboard and inboard lites.
4. Total Thickness: 1 inch unless otherwise required by framing system.
5. Warm-edge spacer.
6. Thermal Transmittance (U-Value): 0.25, nominal.
7. Visible Light Transmittance (VLT): 64 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.27, nominal.
9. Glazing Method: Dry glazing method, gasket glazing.

## **2.5 MONOLITHIC GLAZING UNITS**

- A. General - Combined Requirements: If a particular glass unit is indicated to comply with more than one type of requirement, such as color, safety characteristics, or other requirements. Comply with all specified requirements for each type as scheduled on Drawings.
- B. Monolithic Safety Glazing: Walls.
  1. Applications: Interior all-glass storefront partitions.
  2. Glass Type: Fully tempered float glass.
  3. Tint: Clear.
  4. Thickness: 1/2 inch, nominal.
- C. Monolithic Safety Glazing: Openings
  1. Applications:
    - a. Glazed lites in doors, except fire doors.

- b. Glazed sidelights to doors, except in fire-rated walls and partitions.
  - c. Other locations required by applicable federal, state, and local codes and regulations.
  - d. Other locations indicated on drawings.
2. Glass Type: Fully tempered safety glass as specified.
  3. Tint: Clear.
  4. Thickness: 1/4 inch, nominal.

## **2.6 GLAZING COMPOUNDS**

### **A. General Requirements:**

1. Provide black exposed glazing accessory materials, unless specifically indicated otherwise.
2. Provide materials of hardness as recommended by manufacturer for required application and condition of installation in each case. Provide only compounds which are known to be fully compatible with surfaces contacted, including glass products, seals, and glazing channel surfaces.

### **B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.**

### **C. Manufacturers:**

1. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
2. Dow Corning Corporation: [www.dowcorning.com/construction/#sle](http://www.dowcorning.com/construction/#sle).
3. Master Builders Solutions: [www.master-builders-solutions.com/en-us/#sle](http://www.master-builders-solutions.com/en-us/#sle).
4. Momentive Performance Materials, Inc: [www.momentive.com/#sle](http://www.momentive.com/#sle).
5. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
6. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).

## **2.7 ACCESSORIES**

- ### **A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.**

- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
  - 1. Size gaskets as required by manufacturer of glazing channel frame to provide proper pressure and bite on glazing units.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **3.1 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry immediately before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

#### **3.3 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

### **3.4 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.5 INSTALLATION - BUTT JOINT GLAZING METHOD (SEALANT ONLY)**

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Temporarily brace glass in position for duration of glazing process; mask edges of glass at adjoining glass edges and between glass edges and framing members.
- C. Temporarily secure a small diameter nonadhering foamed rod on back side of joint.
- D. Apply sealant to open side of joint in continuous operation; thoroughly fill joint without displacing foam rod, and then tool sealant surface smooth to concave profile.
- E. Permit sealant to cure then remove foam backer rod, and then apply sealant to opposite side, tool smooth to concave profile.
- F. Remove masking tape.

### **3.6 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

**3.7 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION 088000**



## **SECTION 090561 - COMMON WORK RESULTS FOR FLOORING PREPARATION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient flooring.
  - 2. Other adhesively applied flooring.
- B. Preparation of new concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Adhesive bond testing.
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2019.
- C. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- D. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- E. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- F. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

- G. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
  - 1. Manufacturer's qualification statement.
  - 2. Certificate: Manufacturer's certification of compatibility with types of flooring and adhesive applied over remedial product.
  - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  - 4. Manufacturer's installation instructions.
  - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- D. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.
  - 3. Moisture and alkalinity (pH) test reports.
  - 4. Copies of specified test methods.
  - 5. Recommendations for remediation of unsatisfactory surfaces.
  - 6. Product data for recommended remedial coating.
  - 7. Submit report to Architect.



8. Submit report not more than two business days after conclusion of testing.
- E. Adhesive Bond and Compatibility Test Report.
- F. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.

### **1.5 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
  1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
  1. Provide access for and cooperate with testing agency.
  2. Confirm date of start of testing at least 10 days prior to actual start.
  3. Allow at least 4 business days on site for testing agency activities.
  4. Achieve and maintain specified ambient conditions.
  5. Notify Architect when specified ambient conditions have been achieved and when testing will start.
- E. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.
- F. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

## 1.7 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## 1.8 WARRANTY

- A. Provide manufacturer's warranty covering flooring delamination failures for 10 years minimum.
  - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Self-Leveling Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product
  - 1. Compressive Strength: Minimum 5000 pounds per square inch after 28 days, tested per ASTM C109/C109M.
  - 2. Flexural Strength: Minimum 1000 psi after 28 days, tested according to ASTM C348.
  - 3. Thickness: Capable of thicknesses from 1/2 inch minimum to maximum [10] inch.
- B. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

4. Acceptable Manufacturers:
  - a. ARDEX Engineered Cements; ARDEX Feather Finish:  
[www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat:  
[www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  - c. LATICRETE International, Inc; SKIM LITE: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  - d. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch:  
[www.usg.com/#sle](http://www.usg.com/#sle).
  - e. Schonox HPS North America; Schonox SL Moisture Resistant Floor Patch and Skim Coat.
  - f. Custom Building Products.
  - g. Henry Company.
  - h. Sika; Level SkimCoat.
  - i. Mapei.
  - j. Substitutions: See Section 016000 - Product Requirements.
- C. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- D. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  2. Use product recommended by flooring manufacturer. In the absence of a recommendation from flooring manufacturer, use testing agency recommendation. In the absence of testing agency recommendation, use one of the following systems.
  3. Acceptable Products:
    - a. Allied Construction Technologies, Inc; AC Tech 2170 FC:  
[www.actechperforms.com/#sle](http://www.actechperforms.com/#sle).

- b. ARDEX Engineered Cements; ARDEX VB 100:  
[www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - c. Custom Building Products; TechMVC Moisture Vapor and Alkalinity Barrier:  
[www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  - d. Floor Seal Technology, Inc; MES 100: [www.floorseal.com/#sle](http://www.floorseal.com/#sle).
  - e. ISE Logik Industries; MVEC 710 with MVBP 600.
  - f. LATICRETE International, Inc; LATICRETE VAPOR BAN E:  
[www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  - g. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer:  
[www.sikafloorusa.com/#sle](http://www.sikafloorusa.com/#sle).
  - h. SINAK Corporation; VECT-R: [www.sinak.com/#sle](http://www.sinak.com/#sle).
  - i. USG Corporation; Durock CoverPrep: [www.usg.com/#sle](http://www.usg.com/#sle).
  - j. UZIN UTZ NORTH AMERICA, INC; UZIN PE 460 with UZIN PE 280:  
<https://us.uzin.com/#sle>.
  - k. Substitutions: See Section 016000 - Product Requirements.
- E. Remedial Colloidal Silica Floor Treatment: Clear, penetrating floor treatment intended by its manufacturer to vapor-proof concrete slabs by closing capillary system of concrete, and eliminating route of moisture vapor emission while preserving mechanical key for adhesive bonding.
- 1. Acceptable Products:
    - a. Spray-Lock Concrete Protection; SCP 327: [www.concreteprotection.com](http://www.concreteprotection.com).
    - b. Substitutions: See Section 016000 - Product Requirements.
- F. Water Vapor Emission Controlling Curing Compound: Single-component curing compound for preventative water vapor emission control for newly placed concrete.
- 1. Coordinate with curing requirements specified in 033000 - Cast-in-Place Concrete.
  - 2. Comply with ASTM C309 and ASTM C1315, Type I Class A or C.
  - 3. Acceptable Products:
    - a. Creteseal Concrete Waterproofing Products, Inc.; Creteseal 2000:  
[www.creteseal.com](http://www.creteseal.com).
    - b. Floor Seal Technology, Inc.; VaporSeal 309 System: [www.floorseal.com](http://www.floorseal.com).

- c. SINAK Corporation; VC5: [www.sinak.com](http://www.sinak.com).
- d. Substitutions: See Section 016000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.1 CONCRETE SLAB PREPARATION**

- A. Perform following operations in the order indicated:
  - 1. Preliminary cleaning.
  - 2. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
  - 3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 4. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 5. Specified remediation, if required.
  - 6. Patching, smoothing, and leveling, as required.
  - 7. Other preparation specified.
  - 8. Adhesive bond and compatibility test.
  - 9. Protection.
- B. Remediations:
  - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  - 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

### **3.2 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

### **3.3 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

### **3.4 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
  - 1. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

- E. Report: Report the information required by the test method.

### **3.5 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
  - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
  - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
  - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

### **3.6 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

### **3.7 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

### **3.8 APPLICATION**

- A. Comply with requirements and recommendations of manufacturer.
- B. Curing compounds and membrane forming products are usually considered unacceptable by flooring and adhesive manufacturers. If such materials are used, either obtain the approval of the flooring and adhesive manufacturers prior to use.

**3.9 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION 090561**



## **SECTION 092216 - NON-STRUCTURAL METAL FRAMING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Wood blocking within stud framing.
- B. Section {id\#462} - {t\#462}: Execution requirements for anchors for attaching work of this section.

#### **1.3 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
- B. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.
- C. AISI S220 – North American Specification for the Design of Cold-Formed Steel Framing – Nonstructural members.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- 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 E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

- L. ASTM E413 - Classification for Rating Sound Insulation; 2022.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate prefabricated work, component details, framed openings, anchorage to structure, acoustic details, and accessories.
  - 2. Describe method for securing studs to tracks, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Evaluation Reports: Submit evaluation reports for framing, tracks, anchors, and fasteners from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- B. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202 "Code of Standard Practice."

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Metal Framing, Connectors, and Accessories:
  - 1. CEMCO: [www.cemcosteel.com/#sle](http://www.cemcosteel.com/#sle).

2. ClarkDietrich Building Systems: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
3. Jaimes Industries: [www.jaimesind.com/#sle](http://www.jaimesind.com/#sle).
4. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
5. MBA Building Supplies, Inc.: [www.mbastuds.com](http://www.mbastuds.com).
6. State Building Products, Inc.: <http://www.statebp.com>.
7. Steel Construction Systems: [www.steelconsystems.com/#sle](http://www.steelconsystems.com/#sle).
8. The Steel Network, Inc: [www.SteelNetwork.com/#sle](http://www.SteelNetwork.com/#sle).
9. Substitutions: See Section 016000 - Product Requirements.

## 2.2 FRAMING MATERIALS

- A. Design Requirements: Contractor is responsible for designing metal framing used to comply with performance requirements, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
  1. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members" and ASTM C645, Section 10, unless otherwise indicated.
- B. Performance Requirements:
  1. Interior Suspended Gypsum Board Ceilings, Soffits, and Bulkheads: Design and install to provide deflection of not more than  $L/360$  of distance between supports.
  2. Interior Metal Stud/Gypsum Board Assemblies: Design and install to withstand lateral loading (air pressure) of 5 PSF with deflection limit not more than  $L/240$  of partition height.
  3. Interior Metal Stud/Gypsum Board Assemblies at Locations with Ceramic Tile or Other Hard Surface Finishes: Design and install to withstand lateral loading (air pressure) with deflection limit not more than  $L/360$  of partition height.
  4. Where documents indicate a stud size, size shall be considered minimum. Increase gage to meet minimum performance requirements.
  5. Accommodate building structure deflections in connections to structure.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- D. Non-Loadbearing Framing System Components: AISI S220 and ASTM C645, Section 10; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of limits listed above.
1. Protective Coating: AISI S220, ASTM A 653/A 653M, G40, (Z120); or coating with equivalent corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
    - a. Galvannealed products are unacceptable.
  2. Studs: C shaped with flat or formed webs.
    - a. Minimum Base-Steel Thickness: 0.0296 inch (20-gage drywall) unless otherwise indicated.
    - b. Minimum Base-Steel Thickness at Wall Tile: 0.033 inch.
    - c. Minimum Base-Steel Thickness at Opening Jambs: 0.033 inch.
  3. Runners: U shaped, sized to match studs.
    - a. Minimum Base-Steel Thickness: Same as studs.
  4. Equivalent Gauge Studs and Runners:
    - a. High strength, roll-formed and embossed with surface deformations to stiffen the framing members so they are structurally comparable to conventional ASTM C645 steel studs and tracks.
    - b. Minimum Base Steel Thickness: 0.0181 inch (20 EQ).
    - c. Prohibited Locations: High-strength (EQ) studs may not be used at the following locations:
      - 1) Walls at vestibules or other areas expected to be exposed to wind loads greater than 5 psf.
      - 2) Walls to receive tile or other inflexible finishes.
      - 3) Walls used to support countertop construction, casework, audio/visual equipment, or other similar elements.
      - 4) Walls greater than 15 feet in height.
    - d. Acceptable Product: ClarkDietrich; ProSTUD20 and ProTRAK20 with Smart Edge technology.
  5. Ceiling Carrying Channels: C shaped (Main Runners).

- a. Minimum Base-Steel Thickness: 0.053 inch.
  - b. Minimum Depth: 1-1/2 inches.
  - c. Minimum flange width: 1/2 inch.
6. Ceiling Furring Channels (Furring Members):
- a. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  - b. Steel Studs and Runners: 0.0296-inch minimum base-steel thickness.
  - c. Equivalent Gauge Studs and Runners: 0.0181 inch (20 EQ) minimum base-steel thickness.
    - 1) Acceptable Product: ClarkDietrich; ProSTUD20 and ProTRAK20 with Smart Edge technology.
  - d. Hat-Shaped, Rigid Furring Channels: 0.0296-inch minimum base-steel thickness, 7/8-inch deep.
7. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- a. Minimum Base-Steel Thickness: 0.0296 inch.
8. Cold-Rolled U-Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
- a. Depth: 1-1/2 inches.
9. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum uncoated-steel thickness of 0.018 inch, and depth required to fit insulation thickness indicated.
- E. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung, non-rated system unless otherwise noted, composed of main beams and cross-furring members that interlock.
1. Acceptable Products:
    - a. Armstrong World Industries, Inc.; Drywall Grid Systems (non-rated).
    - b. Chicago Metallic Corporation; Drywall Grid System (non-rated).
    - c. USG Corporation; Drywall Suspension System (non-rated).
- F. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

- G. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- H. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- I. 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.
  - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
  - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot-dipped galvanized coating.
  - 3. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.
- J. Non-Loadbearing Framing Accessories:
  - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
  - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
    - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
    - b. Products:
      - 1) ClarkDietrich; Pony Wall (PW): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Substitutions: See Section 016000 - Product Requirements.
  - 3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
  - 4. Flexible Wood Backing: Fire-retardant-treated wood with sheet steel connectors.
    - a. Products:
      - 1) ClarkDietrich; Danback: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Substitutions: See Section 016000 - Product Requirements.
  - 5. Sheet Metal Backing: 0.0538 inch thick, galvanized.

6. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
  7. Fasteners: ASTM C1002 self-piercing tapping screws.
  8. Anchorage Devices: Powder actuated.
  9. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- K. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.
1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  2. Tape Thickness: 1/4 inch.
  3. Products:
    - a. Armacell LLC; ArmaSound MTD: [www.armacell.us/#sle](http://www.armacell.us/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
- L. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs.
- M. Acoustic Insulation and Sealant: As specified in Section {id\#462} - {t\#462}.
- N. Isolation Strip at Exterior Walls: Provide one of the following:
1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
  2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

### **2.3 FABRICATION**

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.
- C. Examine areas and substrates for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

### **3.3 INSTALLATION OF STUD FRAMING**

- A. Comply with requirements of ASTM C754.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install bracing at terminations in assemblies.
  - 1. For interior non-load bearing walls indicated to terminate above suspended ceilings provide 20-gauge stud diagonal bracing of walls at door openings, corner wall intersections and at maximum 10'-0" intervals to structural supports or substrates above. Otherwise extend framing full height to structural supports or substrates above suspended ceilings.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- E. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- F. 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.
- G. Align and secure top and bottom runners at 24 inches on center unless otherwise indicated.
- H. At partitions indicated with an acoustic rating:



1. Install acoustic insulation, sealants, and accessories as described in Section 09 21 16.
  2. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
  3. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- I. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
  - J. Install studs vertically at spacing indicated on drawings unless otherwise required to meet performance requirements.
  - K. Install studs so flanges within framing system point in same direction.
  - L. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
  - M. Align stud web openings horizontally.
  - N. Secure studs to tracks using crimping method. Do not weld.
  - O. Stud splicing is not permissible.
  - P. Fabricate corners using a minimum of three studs.
  - Q. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
    1. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
    2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
  - R. Brace stud framing system rigid.
  - S. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
  - T. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
  - U. Furring: Coordinate with sound isolation clip spacing and locations. Lap splices a minimum of 6 inches.

- V. Use sheet metal backing/blocking for reinforcement of the following:
1. Framed openings.
  2. Wall mounted cabinets.
  3. Plumbing fixtures.
  4. Toilet accessories.
  5. Wall mounted door hardware.
  6. Wall mounted televisions or other equipment.

### **3.4 CEILING AND SOFFIT FRAMING**

- A. Contractor's Option: At the Contractor's option suspended ceiling systems may be either suspended steel framing system or grid suspension system.
- B. Comply with requirements of ASTM C754.
- C. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- D. Install furring independent of walls, columns, and above-ceiling work.
- E. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated.
1. Hanger spacing not to exceed 48 inches on center.
- F. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Do not attach hangers to steel roof deck.
  5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- G. Space main carrying channels at maximum 48 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- H. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- I. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- J. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- K. Laterally brace suspension system.
- L. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- M. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

### **3.5 TOLERANCES**

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

**END OF SECTION 092216**



## **SECTION 092900 - GYPSUM BOARD**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 061600 - Sheathing: Exterior wall sheathing.
- B. Section {id\#456} - {t\#456}.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
- E. 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.
- F. 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.
- G. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- H. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022, with Editorial Revision (2023).
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

- J. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.
- K. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).
- L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- N. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- O. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.
- P. GA-600 - Fire Resistance and Sound Control Design Manual; 2024.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- C. Sequencing: Install service utilities in an orderly and expeditious manner.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on gypsum board, accessories, joint finishing system, and acoustic insulation and sealants.
- C. Shop Drawings: Indicate special details associated with acoustic seals.

#### **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.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

- C. Protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

## **1.8 FIELD CONDITIONS**

- A. Environmental Limitations: Comply with requirements of ASTM C840 or gypsum board manufacturer's written recommendations, whichever are more stringent.

## **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.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

### **2.2 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum Company: [www.americangypsum.com](http://www.americangypsum.com).
  - 2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 3. Georgia-Pacific Gypsum: [www.gpgypsum.com](http://www.gpgypsum.com).
  - 4. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 5. USG Corporation: [www.usg.com](http://www.usg.com).
  - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Gypsum Wallboard: 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. Glass mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board unless otherwise required below.
    - a. Glass mat faced gypsum panels are required for all pre-rock applications and gypsum installation prior to building being enclosed.

3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
  - b. Mold resistant board is required in areas subject to wetting, steam, or high humidity.
4. Thickness:
  - a. Vertical Surfaces: 5/8 inch.
  - b. Ceilings: 5/8 inch, unless otherwise noted.
  - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
5. Paper-Faced Products:
  - a. American Gypsum Company; FireBloc Type X Gypsum Wallboard:  
[www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - b. American Gypsum Company; FireBloc Type C Gypsum Wallboard:  
[www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - c. CertainTeed Corporation; Type C Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - d. CertainTeed Corporation; Type X Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - e. Georgia-Pacific Gypsum; ToughRock Fireguard X:  
[www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - f. Georgia-Pacific Gypsum; ToughRock Fireguard C:  
[www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - g. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Fire-Shield Gypsum Board:  
[www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
  - h. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Fire-Shield C 5/8" Gypsum Board:  
[www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
  - i. USG Corporation; Sheetrock Firecode Type X.
  - j. USG Corporation; Sheetrock Firecode Type C.
  - k. USG Corporation; Sheetrock Ecosmart Type X
  - l. Substitutions: See Section 016000 - Product Requirements.



6. Mold-Resistant, Paper-Faced Products:
  - a. American Gypsum Company; M-Bloc Type X:  
[www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - b. American Gypsum Company; M-Bloc Type C:  
[www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - c. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - d. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard:  
[www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - e. National Gypsum Company; Gold Bond XP Gypsum Board.
  - f. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board:  
[www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
  - g. USG Corporation; Sheetrock Mold Tough Firecode Type X.
  - h. USG Corporation; Sheetrock Mold Tough Ecosmart Firecode Type X.
  - i. Substitutions: See Section 016000 - Product Requirements.

C. Impact Resistant Wallboard:

1. Application: Exterior walls of custodial and golf simulator and where indicated in Drawings.
2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
7. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
8. Type: Fire-resistance-rated Type X, UL or WH listed.
9. Surface Weight:

- a. 2.2 lbs per square foot minimum for one 5/8" thick wallboard layer.
10. Thickness: 5/8 inch.
11. Edges: Tapered.
12. Paper-Faced Products:
  - a. American Gypsum Company; M-Bloc IR Type X:  
[www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - b. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech:  
[www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Hi-Impact Gypsum Board:  
[www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
  - d. Substitutions: See Section 016000 - Product Requirements.

### **2.3 ACCESSORIES**

- A. Sound Attenuation Insulation: ASTM C665; mineral fiber or glass fiber batt, friction fit type, unfaced, produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Thickness: As indicated on Drawings, minimum 2 inches.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
  1. Products:
    - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: [www.titebond.com/#sle](http://www.titebond.com/#sle).
    - b. Liquid Nails, a brand of PPG Architectural Coatings:  
[www.liquidnails.com/#sle](http://www.liquidnails.com/#sle).
    - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant:  
[www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
    - d. Pecora Corporation; AC-20 FTR.
    - e. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    - f. Grabber Construction Products; Acoustical Sealant GSC.
    - g. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.

- h. USG Corporation; SHEETROCK Acoustical Sealant.
  - i. Substitutions: See Section 016000 - Product Requirements.
- 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 3. Color of exposed acoustical joint sealants: Match adjacent surface.
- C. Acoustical Outlet Box Pads:
- 1. Minimum thickness - 1/8 inch.
  - 2. Adhesion - adheres readily to metal or plastic.
  - 3. Service temperature - 30 degrees to 200 degrees F.
  - 4. Shall contain no asbestos.
  - 5. Minimum shelf life - 1 year.
  - 6. Non Fire Rated Products:
    - a. Lowry's Outlet Box Pads as manufactured by Harry A. Lowry & Associates, Inc., Sun Valley, CA.
    - b. Sound Pad #68 as manufactured by L.H. Dottie Co., City of Commerce, CA.
- D. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, rigid plastic, or composite, unless noted otherwise.
- 1. Types: As detailed or required for finished appearance.
  - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead, L-bead, LC-bead, and Casing Bead at exposed panel edges.
  - 3. Acceptable Products:
    - a. Same manufacturer as framing materials.
    - b. ClarkDietrich (Finishing Accessories) [www.clarkdietrich.com](http://www.clarkdietrich.com)
    - c. Phillips Manufacturing Co: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
    - d. Trim-tex, Inc: [www.trim-tex.com/#sle](http://www.trim-tex.com/#sle).
    - e. Substitutions: See Section 016000 - Product Requirements.
- E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, coated glass fiber tape for joints and corners exterior and glass-mat gypsum.
  2. Tape: 2 inch wide, creased paper tape for joints and corners for interior gypsum board.
  3. Joint Compound: Drying type, vinyl-based, ready-mixed.
- F. Finishing Compound: Surface coat and primer, takes the place of skim coating.
- G. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- H. 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.
- I. 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.
- J. Anchorage to Substrate: Tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- K. Adhesive for Attachment to Metal:
1. Products:
    - a. Franklin International, Inc; Titebond PROvantage Professional Drywall Adhesive: [www.titebond.com/#sle](http://www.titebond.com/#sle).
    - b. Liquid Nails, a brand of PPG Architectural Coatings: [www.liquidnails.com/#sle](http://www.liquidnails.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 ACOUSTIC ACCESSORIES INSTALLATION

- A. General: Limit installation of outlet boxes and other penetrations to one penetration per stud bay. Seal all penetrations and gaps with acoustic sealant, outlet box pads, or other acoustic shielding materials as approved by Architect in accordance with manufacturer's written instructions and tested assembly instructions.
- B. Preparation for acoustic sealant:
  - 1. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
  - 2. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
  - 3. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- C. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- D. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- E. Acoustic Sealant: Install as follows:
  - 1. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
  - 2. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 3. Place one bead continuously on substrate before installation of perimeter framing members.
  - 4. Place continuous bead at perimeter of each layer of gypsum board.
  - 5. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

- F. Acoustical Outlet Box Pads: Install as follows within acoustic partitions:
  - 1. Remove any water, excess dust, dirt and oil from the surfaces.
  - 2. Comply with manufacturer's written instructions and UL requirements.
  - 3. Ensure the entire surface is covered. Seal around conduit where it connects to outlet box using manufacturer's recommended materials.

### **3.3 BOARD INSTALLATION**

- A. Comply with ASTM C840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- C. Form control and expansion joints with space between edges of adjoining gypsum panels.
- D. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- E. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- F. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- G. Installation on Metal Framing: Use screws for attachment of gypsum board.

- H. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

### **3.4 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
  - 2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.5 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 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
  - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 3. Level 3: Walls to receive textured wall finish.
  - 4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  - 5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- 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.
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

**3.6 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**3.7 PROTECTION**

- A. Protect installed gypsum board assemblies from subsequent construction operations.
- B. Repair damage from construction operations.

**END OF SECTION 092900**



## **SECTION 093000 - TILING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Tile for wall applications.
- B. Coated glass mat backer board as tile substrate.
- C. Tile accessories, setting, and grouting materials.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing joints between tile work and adjacent construction and fixtures.

#### **1.3 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
- B. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- C. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2024.
- D. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2023.

#### **1.4 DEFINITIONS**

- A. Module Size: Actual tile size, with minor facial dimension as measured by ASTM C499, plus joint width indicated.
- B. Facial Dimension: Actual tile size, with minor facial dimension as measured by ASTM C499.
- C. Large Format Tile: Any tile unit that maintains an edge of 15 inches or greater in any dimension.

#### **1.5 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this Section; require attendance by all affected installers.
  - 1. Review installation procedures and coordination requirements.

#### **1.6 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Verification Samples:
  - 1. Full-sized units of each type and composition of tile and for each color and finish specified. For ceramic mosaic tile in color blend patterns, provide one full sheet of each specified color blend.
  - 2. Full-sized units of each type of trim and accessory for each color and finish specified.
  - 3. Grout color samples for each type and color specified.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Installer's Qualification Statement:
  - 1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation; [www.tile-assn.com/#sle](http://www.tile-assn.com/#sle)
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Tile: 5 percent of each size, color, and surface finish combination.

## **1.7 QUALITY ASSURANCE**

- A. Maintain one copy of ANSI A108/A118/A136, TCNA (HB), and TCNA (HB-GP) on-site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
  - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.
    - a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).

- D. Provide materials obtained from only one manufacturer for each type and color of tile, and for each type of mortar, grout, adhesive, and sealant.

#### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

#### **1.9 FIELD CONDITIONS**

- A. Comply with referenced standards and manufacturer's recommendations for protection and maintenance of environmental conditions during and after installation.
- B. Do not install solvent-based products in an unventilated environment.
- C. Maintain ambient and substrate temperature of 50 degrees F during installation, and for at least seven days after installation. Maintain higher temperatures for proprietary mortars and grouts when recommended by manufacturer.
- D. Vent temporary heaters to the exterior to prevent damage to tile work due to carbon dioxide accumulation.

#### **1.10 WARRANTY**

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace materials that fail within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of 2 years.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Manufacturers and products specified on Drawings.
  - 2. Substitutions: See Section 016000 - Product Requirements.

## **2.2 TILING MATERIALS**

- A. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- B. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

## **2.3 TRIM AND ACCESSORIES**

- A. Metal Trim: Finish and types as scheduled, style and dimensions to suit application, for setting using tile mortar or adhesive. Provide trim height to match tile and setting bed thickness.
  - 1. Basis of Design Manufacturer:
    - a. Schluter.
  - 2. Other Acceptable Manufacturers:
    - a. Genesis APS International: [www.genesis-aps.com/#sle](http://www.genesis-aps.com/#sle).
    - b. Ceramic Tool Company, Inc.
    - c. Futura Industries.
    - d. National Metal Shapes, Inc. Aluminum L-S Profiles.
    - e. Substitutions: See Section 016000 - Product Requirements.

## **2.4 SETTING MATERIALS**

- A. Modified Dry Set Cement Mortar Bond Coat: ANSI A118.4 and ANSI A118.11.
  - 1. Applications: Use this type of bond coat where no other type of bond coat is indicated.
  - 2. Products:
    - a. ARDEX Engineered Cements; X 3+: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; MegaLite Crack Prevention Mortar, ProLite Tile & Stone Mortar, or Complete Contact Fortified Mortar: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. H.B. Fuller Construction Products, Inc; TEC Ultimate Large Tile Mortar or Ultimate 6 Plus Mortar: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).

- d. LATICRETE International, Inc; 4-XLT: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- e. Mapei Corporation; Ultralite or Ultracontact: [www.mapei.com](http://www.mapei.com).
- f. Substitutions: See Section 016000 - Product Requirements.

B. Organic Adhesive: ANSI A136.1, thinset mastic type.

## **2.5 GROUTS**

A. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.

- 1. Applications: Use this type of grout where no other type of grout is indicated.
- 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
- 3. Color(s): As selected by Architect from manufacturer's full line.
- 4. Acceptable Products:
  - a. ARDEX Engineered Cements; ARDEX FL (Sanded) or FGC (Unsanded): [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - b. Custom Building Products; Prism Color Consistent Grout: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  - c. H.B. Fuller Construction Products, Inc; TEC AccuColor Plus Grout: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  - d. LATICRETE International, Inc.; LATICRETE PermaColor: [www.laticrete.com](http://www.laticrete.com).
  - e. Mapei Corporation; Ultracolor Plus FA: [www.mapei.com/#sle](http://www.mapei.com/#sle).
  - f. Substitutions: See Section 016000 - Product Requirements.

## **2.6 ACCESSORY MATERIALS**

A. Self-leveling Underlayment: Flowable, pre-formulated, water-mixed latex-Portland cement-based material; self-leveling to provide flat, level surface on tiling substrates, and meeting the requirements of ASTM C627.

- 1. Applications: On concrete substrates.
- 2. Acceptable Manufacturers:
  - a. ARDEX; TL1000.
  - b. Custom Building Products; "LevelQuick RS" Self Leveling Underlayment: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).

- c. LATICRETE International, Inc.; 86 Latilevel Thin Pour: [www.laticrete.com](http://www.laticrete.com).
  - d. Mapei Corporation; Ultraplan M20 Plus: [www.mapei.com](http://www.mapei.com).
  - e. Substitutions: See Section 016000 - Product Requirements.
- B. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
- C. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

#### **3.2 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

#### **3.3 INSTALLATION - GENERAL**

- A. Blending: For tile exhibiting color or pattern variations within the ranges of accepted submittals, verify that tile has been blended in the packages so that tile units taken from one package show same range in colors or patterns as those taken from other packages. If not blended in the packages, blend tile in the field before installation.
- B. Wall System Coverage: Where specified for individual setting methods, install wall tile units with 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile units in referenced ANSI A108 specifications.
- C. Movement Joints: Comply with TCNA (HB) Method EJ171F requirements for locations, spacing, and installation of applicable movement joints, whether or not specifically indicated or detailed on Drawings, and as follows:
- 1. Joint Width: Match adjacent grouted joint widths, unless TCNA EJ171 requires a specific joint width based on joint location or joint service conditions.
  - 2. Apply sealant joint to junction of tile and dissimilar materials and junction of dissimilar planes, including but not limited to floor to wall joints, corners, and metal trim and non-ceramic accessory items.

3. Keep movement joints free of setting adhesive and grout.
  4. Where metal trims are not specified, form internal angles and corners square, not grouted, with sealant joint.
  5. Where metal trims are not specified, form external angles and corners square, not grouted, with sealant joint.
  6. Apply specified sealant to joints.
- D. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- E. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly.
1. Where floor and wall tile are of same dimensional module, align floor and wall joints.
- F. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints, except where movement joints are indicated or specified.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- L. Allow completed tiling assemblies to cure full 72 hours before allowing heavy foot or equipment traffic on final installations.

### **3.4 INSTALLATION - WALL TILE**

- A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method w243.
1. Provide 100 percent coverage of setting mortar over tile back surfaces.

### **3.5 TOLERANCES**

- A. Comply with applicable requirements of ANSI A108.2, unless otherwise specified in this Section.
- B. Flatness - Finished Tiling Surfaces:

1. Ceramic Tile: 1/4 inch in 10 feet.
  2. Stone Tile: 1/8 inch in 10 feet.
- C. Lippage - Adjacent Tile Units:
1. Glazed Wall Tile and Mosaic Tile: 1/32 inch; joint width 1/16 inch to 1/8 inch; 1 x 1 inch to 6 x 6 inch tile size.
  2. Pressed Floor Tile and Porcelain Tile: 1/32 inch; joint width 1/16 inch to less than 1/4 inch; all tile sizes.
  3. Pressed Floor Tile and Porcelain Tile: 1/16 inch; joint width greater than 1/4 inch; all tile sizes.

### **3.6 CLEANING**

- A. Clean tile and grout surfaces.
- B. Remove grout efflorescence as required with product approved by tile and grout manufacturer.
- C. Unglazed tile may be cleaned with sulfamic acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after completion of installation. Protect metal surfaces, iron, and vitreous fixtures from effects of acid cleaning. Flush surfaces with clean water before and after acid cleaning.
- D. Leave finished installation clean and free of cracked, chipped, broken, un-bonded, or otherwise defective tile work.

**END OF SECTION 093000**



## **SECTION 095113 - ACOUSTICAL PANEL CEILINGS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#391} - {t\#391}: Access panels.

#### **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; 2023.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Sequencing: Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

- 1. Do not install acoustical units until after interior wet work is dry.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples minimum 6 x 6 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

## **1.6 QUALITY ASSURANCE**

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

C. System Installer Qualifications: Company specializing in the installation of products specified in this Section with minimum three years documented experience.

## **1.7 FIELD CONDITIONS**

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 20 to 40 percent prior to, during, and after acoustical unit installation.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

A. Basis of Design Manufacturer:

1. As scheduled.

B. Other Acceptable Manufacturers - Acoustic Panels:

1. Armstrong World Industries, Inc.: [www.armstrong.com](http://www.armstrong.com).

2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).

3. Rockfon, LLC: [www.rockfon.com](http://www.rockfon.com).

4. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).

5. Substitutions: See Section 016000 - Product Requirements.

C. Acceptable Manufacturers - Suspension Systems:

1. Same as for acoustical units.

### **2.2 PERFORMANCE REQUIREMENTS**

A. Interior Suspended Ceilings, Soffits, and Bulkheads: Maintain deflection of not more than L/360 of distance between supports.

- B. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

### **2.3 ACOUSTICAL CEILINGS**

- A. Acoustical Units - General: ASTM E1264, Class A.
  - 1. Provide units with manufacturer's proprietary anti-humidity, sag-resistant composition and anti-microbial treatment to inhibit the propagation of mold and mildew.

### **2.4 SUSPENSION SYSTEMS**

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
  - 1. Materials:
    - a. Steel Grid: ASTM A653/A653M, G30 coating, except provide not less than G60 coating for severe or wet environments.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid.
  - 1. Structural Classification: Heavy-duty, when tested in accordance with ASTM C635/C635M.
  - 2. Profile: Tee; 15/16 inch face width unless otherwise noted.
  - 3. Finish: Baked enamel.
  - 4. Color: White, unless otherwise indicated.

### **2.5 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
  - 1. Size: As required for installation conditions.
  - 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
  - 3. At Circular Penetrations: Provide edge moldings fabricated to diameter required to fit penetration precisely.

- E. Touch-up Paint: Type and color to match acoustical and grid units.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

#### **3.3 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

### **3.4 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
  - 1. Cut to fit irregular grid and perimeter edge trim.
  - 2. Make field cut edges of same profile as factory edges; finish cut edges to match factory finished edges if cut edge is exposed to view.
  - 3. Double cut and field paint exposed reveal edges to match factory finished edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 10 ft of an exterior door.

### **3.5 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### **3.6 CLEANING**

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION 095113**



## **SECTION 096500 - RESILIENT FLOORING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Installation accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 09 05 61 - Common Work Results For Flooring Preparation: Independent agency testing of concrete slabs, cleaning, or preparation.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- B. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
- C. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - 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.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Submit two samples, minimum 6 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.

2. Extra Flooring Material: Additional quantity equivalent to 2 percent of each type and color.

### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Deliver and store materials in manufacturer's original unopened containers, with brand names and production lot numbers clearly marked.
- E. Do not double stack pallets.

### **1.7 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a minimum temperature of 65 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
- B. Install resilient flooring and accessories after other finishing operations, including painting have been completed.
- C. Do not install resilient flooring over concrete slabs until slabs have been fully cured, and are sufficiently dry to achieve proper bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.

### **1.8 WARRANTY**

- A. Resilient Flooring: Provide manufacturer's warranty, as follows:
  1. Materials: Minimum 15 years from date of purchase, covering manufacturing defects and wear due to normal foot traffic.
  2. Installation: Minimum 2 years from date of installation; warrant entire installation against loss of adhesion to substrates.



## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Manufacturers and products specified on Drawings.
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.2 TILE FLOORING**

- A. Luxury Vinyl Tile:
  - 1. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648, NFPA 253, ASTM E648, or NFPA 253.
  - 3. Wear Layer Thickness: 0.020 inch minimum.
  - 4. Total Thickness: 5mm.
  - 5. Type and Color: As indicated on drawings.

### **2.3 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Adhesives: Waterproof; types recommended by flooring manufacturer.
  - 1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.
- C. Resilient Wall Base, Edge Strips, and Accessories: Specified in Section 09 65 13.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Minimum F(F) Floor Flatness Values:

1. Under Resilient Flooring: F(F) of 35.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  1. Test in accordance with Section {id\#3760}.
  2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
  3. If flooring manufacturer does not recommend specific remediation materials and procedures, follow moisture and alkalinity remediation procedures in Section 09 05 61.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.2 PREPARATION**

- A. Prepare floor substrates for installation of flooring in accordance with Section {id\#3760}.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Clean substrate.

### **3.3 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
  1. Spread only enough adhesive to permit installation of materials before initial set.
  2. Fit joints and butt seams tightly.
  3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
  1. Resilient Strips: Attach to substrate using adhesive.

- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

### **3.4 INSTALLATION - TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Install flooring in pattern as indicated in drawings. Allow minimum 1/2 full size tile width at room or area perimeter.
- C. Install plank tile with a random offset of at least 6 inches from adjacent rows.

### **3.5 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.6 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Place protective coverings over finished floors; do not remove coverings until Date of Substantial Completion.

**END OF SECTION 096500**



## **SECTION 096513 - RESILIENT WALL BASE AND ACCESSORIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Resilient wall base.
- B. Resilient edge and transition strips.
- C. Flooring system accessories.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - 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.
- C. Selection Samples: If basis of design color is not provided, submit manufacturer's complete set of color samples for Architect's selection.
- D. Verification Samples: Submit two samples, minimum 4x4 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Wall Base: 24 linear feet of each type and color.
  - 3. Clearly identify each package.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Deliver and store materials in manufacturer's original unopened containers, with brand names and production lot numbers clearly marked.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

#### **1.6 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a minimum temperature of 65 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
- B. Install resilient accessories after other finishing operations, including painting have been completed.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design Manufacturers:
  - 1. Manufacturers and products specified on Drawings.
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.2 RESILIENT BASE**

- A. General: Comply with adhesives and sealants and flooring system product requirements specified.
- B. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set, Style B, Cove.
  - 1. Acceptable Manufacturers:
    - a. Mannington Commercial: [www.manningtoncommercial.com](http://www.manningtoncommercial.com).
    - b. Johnsonite, a Tarkett Company: [www.commercial.tarkett.com](http://www.commercial.tarkett.com)
    - c. Roppe Corp.: [www.roppe.com](http://www.roppe.com).
    - d. ShawContract: [www.shawcontract.com](http://www.shawcontract.com).
    - e. Substitutions: See Section 016000 - Product Requirements.
  - 2. Group: I (solid, homogeneous).

3. Height: 4 inch.
4. Thickness: 0.125 inch.
5. Finish: Satin.
6. Color: As indicated on drawings.

### **2.3 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Adhesives: Waterproof; types recommended by flooring manufacturer.
  1. Compatible with materials being adhered; maximum VOC content of 50 g/L.
- C. Moldings and Edge Strips: Homogeneous vinyl or rubber type; tapered or bullnose edge; one inch wide; color selected by Architect.
- D. Moldings, Transition and Edge Strips: As scheduled in drawings.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

### **3.2 PREPARATION**

- A. Prepare substrates as recommended by flooring and adhesive manufacturers.
- B. Remove substrate ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
  1. Prohibit traffic until filler is fully cured.
- C. Clean substrate.

### **3.3 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
  1. Spread only enough adhesive to permit installation of materials before initial set.
  2. Fit joints and butt seams tightly.

### **3.4 INSTALLATION - RESILIENT BASE**

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Fit joints tightly and make vertical. Install in longest lengths possible; maintain minimum dimension of 18 inches between joints.
- C. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold.
  - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. Do not stretch wall base during installation.
- F. Scribe and fit to door frames and other interruptions.

### **3.5 INSTALLATION - RESILIENT ACCESORIES**

- A. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
  - 1. Type and Location: As indicated in Drawings.
  - 2. Resilient Strips: Attach to substrate using adhesive.

### **3.6 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.7 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION 096513**



## **SECTION 096566 - RESILIENT ATHLETIC FLOORING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Rubber sheet flooring, adhesively installed.
- B. Painted game lines.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3760} - {t\#3760}: Concrete slab moisture and alkalinity testing and remediation procedures.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, and layout, colors, and widths of game lines and equipment locations.
- D. Selection Samples: Manufacturer's color charts for flooring materials specified and game line paints, indicating full range of colors and textures available.
- E. Verification Samples: Actual flooring material specified, not less than 12 inch square, mounted on solid backing.
- F. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Basis of Design: Specifications for flooring products are based on systems by the specified basis of design manufacturer. Flooring types manufactured by other acceptable manufacturers are permitted, subject to compliance with all performance requirements; and provided that deviations in composition and coloration are minor, and do not detract substantially from the indicated design intent.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

## **1.8 FIELD CONDITIONS**

- A. Install resilient flooring and accessories after other finishing operations, including painting have been completed.
- B. Do not install resilient flooring over concrete slabs until slabs have been fully cured for at least 30 days, and are sufficiently dry to achieve proper bond as determined by flooring manufacturer's recommended bond and moisture test.
- C. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70 to 95 degrees F for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F or to go above 100 degrees F.

## **1.9 WARRANTY**

- A. Resilient Flooring: Provide manufacturer's warranty, as follows:
  - 1. Materials: Minimum 10 years from date of purchase.
  - 2. Installation: Minimum 2 years from date of installation; warrant entire installation against loss of adhesion to substrates.

## **PART 2 PRODUCTS**

### **2.1 PREFORMED ATHLETIC FLOORING**

- A. Rubber Track Surfacing: Shock-absorbing honeycomb design.
  - 1. Thickness: 0.531 inches.

2. Construction: Vulcanized, dual durometer construction, having a shore hardness of the top layer (wear layer) greater than the bottom layer (backing).
    - a. Wear Layer Durometer Hardness, Type A: Minimum of 50, when tested in accordance with ASTM D2240.
    - b. Backing Layer Durometer Hardness, Type A: Minimum of 40, when tested in accordance with ASTM D2240.
  3. Surface Texture: Non-directional tessellation patterns with interconnected surface channels.
  4. Color: As selected from manufacturer's standard range.
  5. Basis of Design:
    - a. Mondo Super X 720
- B. Rubber Sheet Flooring: Two-layer vulcanized rubber.
1. Thickness: 8 mm.
  2. Sheet Width: Minimum 72 inches minimum.
  3. Wear Layer Durometer Hardness, Type A: Minimum of 80, when tested in accordance with ASTM D2240.
  4. Surface Texture: Smooth.
  5. Color: As selected from manufacturer's standard range.
  6. Basis of Design:
    - a. Mondo Advance.

## **2.2 ACCESSORIES**

- A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.
  1. Compressive Strength: 3,500 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Flooring Adhesive: Waterproof; types recommended by flooring manufacturer.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.

- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of athletic flooring to substrate.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section {id\#3760}.
  - 2. Conduct tests by an independent testing agency acceptable to Owner.
    - a. See Section {id\#3760}.
  - 3. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
  - 4. Follow moisture and alkalinity remediation procedures in Section {id\#3760}.

### **3.2 PREPARATION**

- A. Prepare floor substrates for installation of flooring in accordance with Section {id\#3760}.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius.
- D. Remove coatings or curing compounds that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
- E. Broom clean areas to receive athletic flooring immediately before beginning installation.

### **3.3 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions and approved shop drawings.
- C. Resilient Sheet Flooring:
  - 1. Unroll flooring and allow to relax before beginning installation.
  - 2. Mix adhesive thoroughly and apply to substrate with notched trowel. Roll flooring into fresh adhesive, butting factory edges and compression fitting.

3. Roll entire flooring surface with steel roller to assure adhesion to substrate and eliminate air bubbles.
4. Immediately remove any adhesive from flooring surface, using chemical recommended by flooring manufacturer.
5. Weld seams using techniques and equipment recommended by manufacturer.
6. Lay out game lines using tape and taping machine approved by flooring manufacturer. Apply game line paint with roller, and allow to dry before removing tape.

#### **3.4 CLEANING**

- A. Clean flooring using methods recommended by manufacturer.

#### **3.5 PROTECTION**

- A. Protect finished athletic flooring from construction traffic to ensure that it is without damage upon Date of Substantial Completion.

**END OF SECTION 096566**



## **SECTION 098430 - SOUND-ABSORBING WALL AND CEILING UNITS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Sound-absorbing ceiling units.
- B. Mounting accessories.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. ASTM E795 - Standard Practices for Mounting Test Specimens during Sound Absorption Tests; 2023.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout and attachment hardware.
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.
- E. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.
- F. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with at least three years of documented experience.
- B. Basis of Design: Specifications are based on products by specified basis of design manufacturer. Products manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in design, performance, composition, color, and profile are minor, and do not detract substantially from the indicated design intent.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

## **PART 2 PRODUCTS**

### **2.1 FELTED SOUND-ABSORBING UNITS**

- A. Acceptable Manufacturers:
  - 1. Arktura.
  - 2. Autex Acoustics
  - 3. BuzziSpace.
  - 4. EzoBoard.
  - 5. FilzFelt.
  - 6. Kirei.
  - 7. Linea.
  - 8. MDC.
  - 9. Polysorb.
  - 10. Sonus.
  - 11. USG.
- B. Felt Ceiling Baffles:
  - 1. Material: Recycled polyester (PET) felt formed to specified dimensions.
  - 2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 3. Noise Reduction Coefficient (NRC): 0.50 minimum when tested in accordance with ASTM C423.
  - 4. Shape: Trapezoid/Simple Profile.
  - 5. Material Thickness: 1/2 inch nominal.
  - 6. Baffle Dimensions: 92 and 72 inch units, as indicated in Drawings.



7. Color: As scheduled.
8. Mounting: Vertically suspended from suspension system by one edge of panel by manufacturer's standard hardware.
  - a. Provide double channel across multiple baffles to prevent independent swaying.
9. Basis of Design Manufacturer:
  - a. Kirei; Simple Baffle.
10. Suspension System: Manufacturer's standard cable mount system.

## **2.2 ACCESSORIES**

- A. Spline-Mounting Accessories: Manufacturer's standard concealed connecting splines of extruded aluminum designed for screw attachment to walls, with coordinating moldings and trim for interior and exterior corners and miscellaneous conditions.
  1. Color of Exposed Trim: As selected from manufacturer's standards.
- B. Ceiling-Suspended Accessories: Manufacturer's standard accessories at locations as indicated on each acoustical unit, sized appropriately for weight of acoustical unit.
  1. Provide galvanized wire for suspension from ceiling at heights as indicated.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Install mounting accessories and supports in accordance with shop drawings.
- C. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- D. Suspend ceiling baffles at locations and heights as indicated.

### **3.3 CLEANING**

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

**3.4 PROTECTION**

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

**END OF SECTION 098430**

## **SECTION 099113 - EXTERIOR PAINTING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Materials for backpriming woodwork.
- D. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Non-metallic roofing and flashing.
  - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
  - 7. Weathering steel.
  - 8. Floors, unless specifically indicated.
  - 9. Ceramic and other types of tiles.
  - 10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco, unless otherwise noted.
  - 11. Glass.
  - 12. Concealed pipes, ducts, and conduits.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#203} - {t\#203}: Shop-primed items.
- B. Section {id\#4045} - {t\#4045}.

### **1.3 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

### **1.4 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- D. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- F. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- G. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

### **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
  - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, siding, and factory finished metals, have been approved.

- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

#### **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.

#### **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 paint and finishes 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: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 2. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 3. Benjamin Moore: [www.benjaminmoore.com](http://www.benjaminmoore.com).
- C. Primer Sealers: Same manufacturer as top coats.

### **2.2 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

- a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - b. SCAQMD 1113 Rule.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens 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.
1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

### **2.3 PAINT SYSTEMS - EXTERIOR**

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including applications listed below.
1. Two top coats and one coat primer.
    - a. If flash rusting occurs, use two coats of primer.
  2. Top Coat(s): Exterior Latex; MPI #10, 11, 15.
    - a. Application: Concrete and concrete masonry substrates, where indicated.
    - b. Products:
      - 1) PPG Paints Speedhide Exterior 100% Acrylic Latex.
      - 2) Benjamin Moore Ben 100% Acrylic Exterior Finish.
      - 3) Sherwin Williams A-100 Exterior Acrylic Latex.
  3. Top Coat(s): Exterior Light Industrial Coating, Water Based; MPI #161, 163, or 164.
    - a. Application: Primed and galvanized metals (doors, fences, lintels, etc).
    - b. Products:
      - 1) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel.
      - 2) Benjamin Moore Super Spec HP DTM Acrylic.

- 3) Sherwin Williams Pro Industrial DTM Acrylic B66 Series.
4. Top Coat Sheen:
  - a. Flat: MPI gloss level 1; use this sheen for overhead surfaces.
  - b. Satin: MPI gloss level 4; use this sheen at wood, cementitious or masonry substrates unless otherwise noted.
  - c. Semi-Gloss: MPI gloss level 5; use this sheen at metal substrates unless otherwise noted.
5. Primer: As recommended by top coat manufacturer for specific substrate.

## 2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

1. Alkali Resistant Water Based Primer; MPI #3.
  - a. Products:
    - 1) PPG Paints: 4-603XI Perma-Crete Interior/Exterior Alkali Resistant Primer. (MPI #3)
    - 2) Benjamin Moore Ultra Spec Acrylic High-Build Masonry Primer.
    - 3) Sherwin Williams Loxon Concrete & Masonry Primer (MPI #3).
2. Interior/Exterior Latex Block Filler; MPI #4.
  - a. Products:
    - 1) Kilz Pro-X p50 Block Filler Primer.
    - 2) PPG Paints: 6-15XI Speedhide Masonry Hi Fill Latex Block Filler. (MPI #4)
    - 3) Benjamin Moore Ultra Spec High-Build Masonry Block Filler.
    - 4) Sherwin Williams B25W25 Preprite Block Filler. (MPI #4).
3. Water Based Primer for Galvanized Metal; MPI #134.
  - a. Products:
    - 1) PPG Paints: 4020 PF Pitt-Tech Plus Interior/Exterior Waterborne Acrylic Primer Finish DTM Industrial Enamel. (MPI #134).
    - 2) Sherwin Williams Pro-Cryl Universal Metal Primer B-66 Series.



4. Rust-Inhibitive Water Based Primer.
  - a. Products:
    - 1) Benjamin Moore: MO4 Acrylic Metal Primer.
    - 2) ICI Paints: Devco Coatings DevFlex 4020PF Direct to Metal Primer & Flat Finish.
    - 3) PPG Industries: 90-708 Series, Pitt-Tech One-Pack Interior/Exterior Industrial Primer.
    - 4) Sherwin Williams: DTM Acrylic Primer Finish B66W1.

## **2.5 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin application of paints and finishes 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 effect 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.

### **3.2 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to 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 paints or finishes that exhibit surface defects.

- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- H. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- I. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
  - 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.3 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

- G. Sand metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.4 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.5 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### **3.6 SCHEDULE**

- A. Paint ME-OP-3L - Ferrous Metals, Unprimed, Opaque, 3 Coat:
  - 1. One coat of primer.
  - 2. Semi-gloss: Two coats of light industrial coating.
- B. Paint ME-OP-2L - Ferrous Metals, Primed, Opaque, 2 Coat:
  - 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
  - 2. Semi-gloss: Two coats of light industrial coating.
- C. Paint MgE-OP-3L - Galvanized Metals, Opaque, 3 Coat:
  - 1. One coat galvanize primer.
  - 2. Semi-gloss: Two coats of light industrial coating.
- D. Paint CE-OP-3L - Masonry/Concrete, Opaque, 3 Coat:
  - 1. One coat of block filler.
  - 2. Satin: Two coats of latex enamel.

**END OF SECTION 099113**



## **SECTION 099123 - INTERIOR PAINTING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Materials for backpriming woodwork.
- D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Prime surfaces to receive wall coverings.
  - 3. Mechanical and Electrical:
    - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
    - c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically indicated.

8. Ceramic and other tiles.
9. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
10. Glass.
11. Acoustical materials, unless specifically indicated.
12. Concealed pipes, ducts, and conduits.

## **1.2 RELATED REQUIREMENTS**

- A. Section 01203 - Shop-primed items.
- B. Section 04044.

## **1.3 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

## **1.4 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- I. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

## **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
  2. MPI product number (e.g., MPI #47).
  3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
  2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
  3. Allow 30 days for approval process, after receipt of complete samples by Architect.
  4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as factory finished metals, wood cabinets, and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  2. Label each container with color in addition to the manufacturer's label.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

## **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.

## **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 materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 2. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 3. Benjamin Moore: [www.benjaminmoore.com](http://www.benjaminmoore.com).
- C. Primer Sealers: Same manufacturer as top coats.

### **2.2 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.



1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:

1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
  - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - b. SCAQMD 1113 Rule.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: As indicated on drawings.

1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

## **2.3 PAINT SYSTEMS - INTERIOR**

### **A. LATEX PAINTS**

1. Paint I-OP-3L - Interior Latex Enamel.

a. Products:

- 1) PPG Paints Speedhide Zero Interior Latex, 6-4110XI Series, Flat. (MPI #53)
- 2) PPG Paints Speedhide Zero Interior Latex, 6-4310XI Series, Eggshell. (MPI #44)
- 3) PPG Paints Speedhide Zero Interior Latex, 6-4410XI Series, Satin. (MPI #52)
- 4) PPG Paints Speedhide Zero Interior Latex, 6-4510XI Series, Semi-Gloss. (MPI #54)
- 5) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat. (MPI #53)
- 6) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss. (MPI #43)
- 7) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Low Sheen. (MPI #44)
- 8) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Eg-Shel. (MPI #52)
- 9) Benjamin Moore Ultra Spec 500 Flat N536. (MPI #53)
- 10) Benjamin Moore Ultra Spec 500 Low Sheen N537. (MPI #44)
- 11) Benjamin Moore Ultra Spec 500 Eggshell N538. (MPI #52)
- 12) Benjamin Moore Ultra Spec 500 Semi-Gloss N539. (MPI #43)

B. WATERBASED EPOXY PAINTS

1. Paint I-OP-3EW - Waterbased Epoxy.

a. Products:

- 1) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-310 Series, Eggshell. (MPI #151)
- 2) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series, Semi-Gloss. (MPI #153)
- 3) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #151)

- 4) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #153)
- 5) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy, V342, Eggshell. (MPI #151)
- 6) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy, V341, Semi-Gloss. (MPI #153)

### C. ACRYLIC PAINTS

#### 1. Paint MI-OP-3LA - Acrylic Enamel.

##### a. Products:

- 1) PPG Paints Pitt-Tech Plus WB DTM Industrial Enamel, 90-1210 Series, Semi-Gloss. (MPI #153)
- 2) Sherwin-Williams Pro Industrial DTM Acrylic, B66 Series, Semi-Gloss (MPI #153)
- 3) Benjamin Moore Super Spec HP DTM Acrylic, Semi-Gloss. (MPI #153)

#### 2. Paint Msl-OP-3D - Acrylic Dry Fall.

##### a. Products:

- 1) PPG Paints Speedhide Super Tech Water Based Interior Dry-Fog Latex, 6-724XI, Eggshell. (MPI #155)
- 2) Sherwin-Williams Waterborne Acrylic Dryfall, Flat. (MPI #118).
- 3) Benjamin Moore Latex Dry Fall, Flat. (MPI #118)

## 2.4 PRIMERS

### A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

#### 1. Alkali Resistant Water Based Primer.

##### a. Products:

- 1) PPG Paints Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603XI. (MPI #3)
- 2) Sherwin-Williams Loxon Concrete and Masonry Primer Sealer, LX02W50. (MPI #3)

- 3) Benjamin Moore High Build Acrylic Masonry Primer, 068.
2. Interior/Exterior Latex Block Filler.
  - a. Products:
    - 1) Kilz Pro-X p50 Block Filler Primer.
    - 2) PPG Paints Speedhide Masonry Hi Fill Latex Block Filler, 6-15XI .
    - 3) Sherwin-Williams PrepRite Block Filler.
3. Interior Drywall Primer Sealer.
  - a. Products:
    - 1) PPG Paints Speedhide Zero Interior Latex Sealer, 6-4900XI.
    - 2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28 Series.
    - 3) Benjamin Moore Ultra Spec 500 Primer 534.
4. Interior Rust-Inhibitive Water Based Primer.
  - a. Products:
    - 1) PPG Paints Pitt-Tech Plus Interior/Exterior DTM Waterborne Acrylic Primer/Finish, 4020 PF Series.
    - 2) Sherwin-Williams Pro-Cryl Universal Waterbased Primer.
    - 3) Benjamin Moore Ultra Spec HP Acrylic Metal Primer, HP04.
5. Interior Water Based Primer for Galvanized Metal.
  - a. Products:
    - 1) PPG Paints Pitt-Tech Plus Interior/Exterior DTM Waterborne Acrylic Primer/Finish, 4020 PF Series. (MPI #134)
    - 2) Sherwin-Williams Pro-Cryl Universal Waterbased Primer.
    - 3) Benjamin Moore Ultra Spec HP Acrylic Metal Primer, HP04.
6. Latex Primer for Interior Wood.
  - a. Products:
    - 1) PPG Paints Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921XI Series. (MPI #39)

- 2) Sherwin Williams Premium Wall & Wood Primer B28W8111.
- 3) Benjamin Moore Fresh Start Multi-Purpose Primer, N023.

## **2.5 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. 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 Masonry Units: 12 percent.

### **3.2 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to 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 paints or finishes that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Concrete:
  - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - 2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
  - 3. Clean concrete according to ASTM D4258. Allow to dry.
  - 4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- G. Masonry:
  - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - 2. Prepare surface as recommended by top coat manufacturer.
  - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- K. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.3 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.4 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
  1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

### **3.5 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### 3.6 SCHEDULE - PAINT SYSTEMS

- A. Paint I-OP-3L - Concrete Non-traffic Surfaces, Latex Enamel (Eggshell):
  - 1. Prime Coat: Alkali Resistant Water Based Primer, 3.0 mils DFT.
  - 2. Intermediate Coat: Latex Enamel, 1.7 mils DFT.
  - 3. Topcoats: Latex Enamel, 1.7 mils DFT.
- B. Paint I-OP-3WE - CMU Substrates, Waterbased Epoxy (Semi-gloss):
  - 1. Block Filler: Masonry Epoxy Block Filler 10 mils DFT.
  - 2. Intermediate Coat: Waterbased Epoxy, 2.5-3.0 mils DFT.
  - 3. Topcoats: Waterbased Epoxy, 2.5-3.0 mils DFT.
- C. Paint MI-OP-3LA - Steel Substrates, Acrylic Enamel (Semi-gloss):
  - 1. Prime Coat: Rust-Inhibitive Water Based Primer, 3.0 mils DFT.
  - 2. Intermediate Coat: Acrylic Enamel, 1.4 mils DFT.
  - 3. Topcoats: Acrylic Enamel, 1.4 mils DFT.
- D. Paint Msl-OP-3D - Steel Substrates, Acrylic Dry-Fall (Exposed Overhead Steel - Flat):
  - 1. Prime Coat: Rust-Inhibitive Water Based Primer, 3.0 mils DFT.
  - 2. Intermediate Coat: Interior Acrylic Dry-Fall, 3.0-4.5 mils DFT.
  - 3. Topcoats: Interior Acrylic Dry-Fall, 3.0-4.5 mils DFT.
- E. Paint I-OP-3L - Gypsum Board Substrates, Latex Enamel (Ceilings - Flat; Walls Except Where Epoxy is Scheduled - Eggshell, Unless Otherwise Noted):
  - 1. Prime Coat: Interior Latex Primer Sealer, 1.4 mils DFT.
  - 2. Intermediate Coat: Latex Enamel, 1.6 mils DFT.
  - 3. Topcoats: Latex Enamel, 1.6 mils DFT.
- F. Paint I-OP-3EW - Gypsum Board Substrates, Waterbased Epoxy (Where Scheduled - Eggshell):
  - 1. Prime Coat: Interior Latex Primer Sealer, 1.4 mils DFT.
  - 2. Intermediate Coat: Waterbased Epoxy, 1.6 mils DFT.



3. Topcoats: Waterbased Epoxy, 1.6 mils DFT.

**END OF SECTION 099123**



## **SECTION 101400 - SIGNAGE**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Room and door signs.
- B. Interior directional and informational signs.
- C. Dimensional letter signs.
- D. Vinyl wall graphics.
- E. Signs required for Building Code compliance and building occupancy.

#### **1.2 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on Drawings, include the drawing room number on schedule.
  - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years of documented experience.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

#### **1.6 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

### **PART 2 PRODUCTS**

#### **2.1 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs:
  - 1. Sign Type: Flat signs with graphic symbols and panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1 inch.
  - 4. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.
  - 5. Interior Rooms: Identify with room names and numbers to be determined later, not those shown on the Drawings, and braille.
- C. Interior Directional and Informational Signs:

1. Sign Type: Flat signs with panel media as specified.
  2. Tactile Exit Signs: Identify with either "EXIT" or "EMERGENCY EXIT" and braille.
    - a. Locations: Adjacent to each door to an egress stairway, exit passageway, and exit discharge.
- D. Code-Required Door and Room Signs: Provide all signs required by Authority Having Jurisdiction (AHJ) for building occupancy; determine requirements and report to Owner and Architect prior to making specified submittals. Include cost of these signs in Contract Sum.

## **2.2 FLAT SIGNS**

- A. Flat Signs: Signage media without frame.
1. Material: Plastic or acrylic having a non-glare finish.
  2. Edges: Square.
  3. Corners: Square.
  4. Wall Mounting of One-Sided Signs: Tape adhesive.
  5. Signs Mounted on Glass: Where signs are mounted on glass, provide blank back-panel of matching size and material to conceal mounting unless otherwise noted.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: As selected by Architect from manufacturer's standard range.
  4. Character Color: Contrasting color as selected.

## **2.3 DIMENSIONAL LETTERS**

- A. Metal Letters:
1. Metal: Aluminum sheet, flat.
  2. Metal Thickness: 1/8 inch minimum.
  3. Letter Height: As indicated on drawings.
  4. Finish: Brushed, satin.
  5. Mounting: Concealed fasteners or pins; 1 inch standoff mount.

## **2.4 CEILING HUNG VINYL LETTERS**

- A. Printed vinyl letters, individually suspended from ceiling by aircraft cable, having hemmed edges for metal tube or pole frame on all four sides.
  - 1. Vinyl: Minimum 15 oz.
  - 2. Colors: As selected by Architect.

## **2.5 VINYL WALL GRAPHICS**

- A. Premium grade, 0.003 inch (3 mil) minimum thickness machine cut graphics, having pressure sensitive adhesive backing.

## **2.6 ACCESSORIES**

- A. Mounting Devices: Except as specified for each sign type, provide mounting devices specifically recommended by manufacturer for indicated application; concealed upon finished installation.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Locate signs where indicated:
  - 1. Emergency Evacuation Maps: Locate centered between elevator doors, or where indicated on Drawings.
  - 2. If no location is indicated obtain Architect's instructions.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION 101400**

## **SECTION 102113.19 - SOLID PLASTIC TOILET COMPARTMENTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Solid plastic toilet compartment doors.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Blocking and supports.
- B. Section {id\#589} - {t\#589}.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate plan, elevation views, dimensions, details of wall supports, door swings.
- D. Selection Samples: Submit manufacturer's full range of available colors, for selection.
- E. Verification Samples: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design:
  - 1. General Partitions Mfg. Corp: [www.generalpartitions.com](http://www.generalpartitions.com).
- B. Acceptable Manufacturers:
  - 1. Bradley Corp.: [www.bradleycorp.com](http://www.bradleycorp.com).

2. ASI Global Steel Products Corp.: [www.globalpartitions.com](http://www.globalpartitions.com).
3. Knickerbocker Partition Corp.: [www.knickerbockerpartition.com](http://www.knickerbockerpartition.com).
4. Substitutions: Section 016000 - Product Requirements.

## **2.2 SOLID PLASTIC TOILET COMPARTMENTS**

- A. Solid Plastic Toilet Compartment Doors: Factory fabricated doors made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286.
  1. Comply with ASTM E84, Class B, for finish surfaces of partition systems.
  2. Color: Single color as selected.
- B. Doors:
  1. Thickness: 1 inch.
  2. Width: 24 inch.
  3. Width for Handicapped Use: 36 inch, out-swinging.
  4. Height: As indicated in Drawings.

## **2.3 ACCESSORIES**

- A. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
- B. Hinges: Stainless steel, manufacturer's standard finish.
  1. Continuous-type hinge, self closing.
- C. Door Hardware: Stainless steel, manufacturer's standard finish.
  1. Door Latch: Slide type with exterior emergency access feature.
  2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
  3. Provide door pull for outswinging doors and on both sides of accessible stall doors.
- D. Coat Hook with Rubber Bumper: One per compartment, mounted on door.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field measurements are as indicated on Drawings.
- B. Verify correct location of built-in framing, anchorage, and bracing.



### **3.2 INSTALLATION**

- A. Install secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between side walls.
- C. Field touch-up of scratches or damaged 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 102113.19**



## **SECTION 102600 - WALL AND DOOR PROTECTION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Corner guards and end guards.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2023, with Editorial Revision.
- B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

#### **1.3 SUBMITTALS**

- A. Product Data: Indicate physical dimensions and anchorage details.
- B. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
  - 1. Submit two sections of corner guards, 12 inches long.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. 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.
- D. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

#### **1.5 WARRANTY**

- A. See Section 017800 - 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. Acceptable Manufacturers - Corner Guards:
  - 1. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  - 2. Construction Specialties, Inc.: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 3. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 4. Koroseal Interior Products: [www.koroseal.com/#sle](http://www.koroseal.com/#sle).
  - 5. Nystrom, Inc.: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 6. Trim-Tex, Inc.: [www.trim-tex.com/#sle](http://www.trim-tex.com/#sle).
  - 7. Substitutions: See Section 016000 - Product Requirements.

### **2.2 PERFORMANCE CRITERIA**

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.
- C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

### **2.3 PRODUCT TYPES**

- A. Corner Guards - Surface Mounted:
  - 1. Material: Polyethylene terephthalate (PET or PETG); PVC-free.
  - 2. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 3. Width of Wings: As indicated in drawings.
  - 4. Corner: Square.
  - 5. Color: As selected by Architect from manufacturer's range of solid colors.

6. Length: One piece.
  7. Preformed end caps.
- B. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

## **2.4 SOURCE QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Provide wall and door protection systems of each type from a single source and manufacturer.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field measurements are as instructed by the manufacturer.
- B. Verify that substrate surfaces for adhered items are clean and smooth.
1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.
- C. 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. Position corner and edge guards 4 inches above finished floor to ceiling, unless otherwise indicated on Drawings.

### **3.3 TOLERANCES**

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

### **3.4 CLEANING**

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

**END OF SECTION 102600**



## **SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Under-lavatory pipe supply covers.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 092216: Placement of reinforcement for backing plate reinforcement.

#### **1.3 REFERENCE STANDARDS**

- A. ADA Standards - 2010 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; 2022.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- F. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.
- G. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).
- H. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- I. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. 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 to receive anchor attachments.

- B. Coordinate locations of accessories with other work to avoid interference, and to assure proper operation and servicing of accessory units.

## **1.5 SUBMITTALS**

- A. See Section 013000 - 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 QUALITY ASSURANCE**

- A. Provide accessories by the same manufacturer for each type of accessory unit. For units exposed in the same areas, provide matching finishes.
- B. Comply with ASTM F446 for grab bars and accessories, anchorage, test methods, and performance.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- B. Pack accessories individually in a manner to protect accessory and its finish.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. ASI - American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Bobrick Washroom Equipment, Inc: [www.bobrick.com](http://www.bobrick.com).
  - 3. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.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 two keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Zinc Alloy: Die cast, ASTM B86.
- G. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- 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. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- D. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.
- E. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

### **2.4 COMMERCIAL TOILET ACCESSORIES**

- A. As scheduled in Drawings.

### **2.5 UNDER-LAVATORY PIPE AND SUPPLY COVERS**

- A. Under-Lavatory Pipe and Supply Covers:
  - 1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
  - 2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.

3. Construction: 1/8 inch flexible PVC.
  - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - b. Comply with ICC A117.1.
4. Color: White.
5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.
- E. See Section 092216 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

#### **3.2 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

#### **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 required by accessibility regulations, unless otherwise indicated.

#### **3.4 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION 102800**

## **SECTION 104300 - EMERGENCY AID SPECIALTIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Automated external defibrillators (AEDs).
- B. Accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Wood blocking product and execution requirements.

#### **1.3 DEFINITIONS**

- A. Automated External Defibrillator (AED): A Food and Drug Administration (FDA)-approved portable device, which automatically analyzes the heart rhythm and recognizes the presence of ventricular fibrillation and/or tachycardia. If defibrillation is warranted, the AED automatically charges and prompts (visual and/or audio) the operator to deliver an electrical shock.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide AED operational features, color and finish, anchorage details, and installation instructions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test schedules and recertification requirements.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Automated External Defibrillators (AEDs):
  - 1. Cardiac Science: [www.cardiacscience.com](http://www.cardiacscience.com).
  - 2. Defibtech: [www.defibtech.com](http://www.defibtech.com).
  - 3. HeartSine Technologies: [www.heartsine.com](http://www.heartsine.com).
  - 4. Philips Medical Systems: [www.usa.philips.com/#sle](http://www.usa.philips.com/#sle).

5. ZOLL Medical Corporation: [www.zoll.com/#sle](http://www.zoll.com/#sle).
6. Substitutions: See Section 016000 - Product Requirements.

B. Emergency Aid Cabinets and Accessories:

1. Activar Construction Products Group, Inc. - JL Industries:  
[www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
2. Defibtech: [www.defibtech.com](http://www.defibtech.com).
3. Cardiac Science: [www.cardiacscience.com](http://www.cardiacscience.com).
4. Modern Metal Products, a division of Technico, Inc: [www.modern-metal.com/#sle](http://www.modern-metal.com/#sle).
5. ZOLL Medical Corporation: [www.zoll.com](http://www.zoll.com)
6. Substitutions: See Section 016000 - Product Requirements.

**2.2 AUTOMATED EXTERNAL DEFIBRILLATORS (AEDS)**

- A. Automated External Defibrillators (AEDs) - General: FDA approval required.

**2.3 EMERGENCY AID CABINETS**

- A. Type: Automated external defibrillator (AED).
- B. Cabinet Construction: Non-fire-rated.
1. Formed primed steel sheet; 0.036 inch thick base metal.
- C. Cabinet Configuration: Surface mounted type.
1. Size to accommodate AED.
  2. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- D. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with wire pull handle and nylon catch. Hinge door for 180 degree opening with two butt hinges.
- E. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with predrilled holes for placement of anchors.
- G. Finish of Cabinet Exterior Trim and Door: Powder coat, white color.
- H. Finish of Door Pull or Handle: Stainless steel.

- I. Finish of Cabinet Interior: White powder coat.

## **2.4 ACCESSORIES**

- A. Cabinet Door Signage: 'AED" decal, or vinyl self-adhering, prespaced red lettering in accordance with authorities having jurisdiction (AHJ).
- B. Plastic Wall Signage: Tent style.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level, 40 inches from finished floor to the centerline of the handle/pull.
- C. Secure rigidly in place.
- D. Place AEDs in cabinets.
- E. Wall Signs:
  - 1. Apply on walls after field painting is completed and has been accepted.
- F. Cabinet Lettering:
  - 1. Location: Face of door framing.
  - 2. Apply lettering on factory-finished cabinets either at the factory or just prior to Substantial Completion.

### **3.3 ADJUSTING AND CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust cabinet doors to operate smoothly without binding. Verify that alarms and integral locking devices operate properly.
- C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

- D. Touch up marred finishes. Replace cabinets that cannot be restored to factory-finished appearance. Use materials and procedures recommended by cabinet manufacturer.

**END OF SECTION 104300**

## **SECTION 104400 - FIRE PROTECTION SPECIALTIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Wood blocking product and execution requirements.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

#### **1.5 QUALITY ASSURANCE**

- A. Basis of Design: Specifications are based on specialty types and model numbers by the specified basis of design manufacturer. Specialty types manufactured by other acceptable manufacturers are permitted, subject to compliance with all specified requirements, and provided that deviations in dimensions and profile are minor, and do not detract substantially from the indicated design intent.

## 1.6 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, Inc. - JL Industries:  
[www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
2. Kidde, a unit of United Technologies Corp.: [www.kidde.com](http://www.kidde.com).
3. Larsen's Manufacturing Co.: [www.larsensmfg.com](http://www.larsensmfg.com).
4. Nystrom, Inc.: [www.nystrom.com](http://www.nystrom.com).
5. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
6. Substitutions: See Section 016000 - Product Requirements.

- B. Cabinet Basis of Design Manufacturer:

1. Larsen's Manufacturing Co.: [www.larsensmfg.com](http://www.larsensmfg.com).
  - a. Fire Extinguisher Cabinets: Architectural Series, 2409 series with Vertical Duo door.

- C. Other Acceptable Cabinet Manufacturers:

1. Activar Construction Products Group: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
2. Kidde, a unit of United Technologies Corp.: [www.kidde.com](http://www.kidde.com).
3. Nystrom, Inc.: [www.nystrom.com](http://www.nystrom.com).
4. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
5. Substitutions: See Section 016000 - Product Requirements.

### 2.2 FIRE EXTINGUISHERS

- A. 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.



- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  - 1. Stored Pressure Operated: Deep Drawn.
  - 2. Class: A:B:C type.
  - 3. Size: 10 pound.
  - 4. Finish: Baked polyester powder coat red color.
  - 5. Temperature Range: -65 degrees F to 120 degrees F.

### **2.3 CABINETS**

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
  - 1. Formed primed steel sheet; 0.036 inch thick base metal.
- C. Fire Rated Cabinet Construction: Fire rating to match wall rating.
  - 1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
- D. Cabinet Configuration: Semi-recessed type, unless otherwise indicated or specified.
  - 1. Sized to accommodate scheduled items and accessories.
  - 2. Semi-Recessed Cabinets: Maximum 4 inch projection from wall surface, including handles and other components.
    - a. Provided recessed handle.
  - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- E. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
  - 1. Glazing Style: Provide Vertical Duo door.
- 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: Finished to match wall color.

- I. Finish of Cabinet Interior: White colored enamel.

## **2.4 ACCESSORIES**

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Lettering: FIRE EXTINGUISHER decal, or vinyl self-adhering, pre-spaced red lettering in accordance with authorities having jurisdiction (AHJ).

## **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: Install cabinets plumb and level in wall openings, maximum 30 inches from finished floor to inside bottom of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.
- E. Position cabinet signage at locations required by Authorities Having Jurisdiction.

**END OF SECTION 104400**

## **SECTION 105129 - PHENOLIC LOCKERS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Phenolic lockers.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#230} - {t\#230}: Wood blocking and nailers.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- C. Shop Drawings: Indicate locker plan layout, numbering plan and key codes.
- D. Samples: Submit two samples 6 by 6 inches in size, of each color scheduled.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Protect locker finish and adjacent surfaces from damage.

#### **1.6 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
- B. Failures include, but are not limited to, the following:
  - 1. Structural failures.
  - 2. Faulty operation of latches and other door hardware
- C. Warranty Period: 10 years from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design:

1. PSiSC; [www.psiscc.com](http://www.psiscc.com).

B. Other Acceptable Manufacturers:

1. ASI Storage Solutions: [www.asi-storage.com/#sle](http://www.asi-storage.com/#sle).
2. Grid: [www.builtbygrid.com/#sle](http://www.builtbygrid.com/#sle).
3. List Industries, Inc: [www.listindustries.com/#sle](http://www.listindustries.com/#sle).

## **2.2 LOCKER APPLICATIONS**

A. Lockers: As indicated on drawings.

1. Width: 18 inches.
2. Depth: 18 inches.
3. Height: 72 inches.
4. Locker Configuration: As indicated on drawings.

## **2.3 PHENOLIC LOCKERS**

A. Lockers: Factory assembled, made of phenolic core panels with mortise and tenon joints and stainless steel mechanical joint fasteners; fully finished inside and out; each locker capable of standing alone.

1. Doors: Full overlay, covering full width and height of locker body; square edges.
2. Hinges: Consealed type from 14 Gauge Type 304 Stainless Steel.
3. Coat Hooks: 11 Gauge Type 304 Stainless Steel with a satin finish.
4. Locker Legs: Provide Locker Legs for all lockers except recessed and base mounted lockers.
5. Built-In Digital Keypad Lock: Battery-powered lock with alphanumeric keypad for 4-digit access code; optional access with programming, manager bypass, or user key.
6. Panel Core Exposed at Edges: Machine polished, without chips or tool marks; square edge unless otherwise indicated.
7. Where locker ends or sides are exposed, finish the same as fronts or provide extra panels to match fronts.
8. Door Color: As selected by Architect.
9. Body Color: Manufacturer's standard white color.

10. Fasteners for Accessories and Locking Mechanisms: Tamperproof type.
- B. Phenolic Core Panels: Nonporous phenolic resin and paper core formed under high pressure, with natural colored finished edges, integral melamine surface, matte finish, and uniform surface appearance; glued laminated panels not acceptable.
  1. Surface Burning Characteristics: Flame spread index of 75 or less, and smoke developed index of 450 or less; when tested in accordance with ASTM E84.
- C. Number Plates: Manufacturer's standard, minimum 4-digit, permanently attached with adhesive; may be field installed. Number Plate shall be engraved from the back side to prevent the accumulation of dirt and grime.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that prepared bases are in correct position and configuration.

#### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.
- D. Bolt adjoining locker units together to provide rigid installation.
- E. Install end panels, filler panels, and sloped tops.
- F. Install accessories.

#### **3.3 CLEANING**

- A. Clean locker interiors and exterior surfaces.

**END OF SECTION 105129**



## **SECTION 113013 - RESIDENTIAL APPLIANCES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Appliances.

#### **1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate clearance requirements and utility service rough-in locations with casework in which appliances are to be installed.

### **PART 2 PRODUCTS**

#### **2.1 APPLIANCES**

- A. Provided by Owner and installed by Contractor.

#### **2.2 ACCESSORIES**

- A. Provide appliances with light bulbs, power cords, and other standard accessories supplied by the manufacturer or required for complete and functional installation of each appliance unit.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify utility rough-ins are provided and correctly located.

#### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

#### **3.3 ADJUSTING**

- A. Adjust equipment to provide efficient operation.

#### **3.4 CLEANING**

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

**END OF SECTION 113013**





## **SECTION 116000 - RECREATION EQUIPMENT**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Basketball backboards, goals, and support framing.
- B. Wall mounted protection pads.
- C. Divider curtains.
- D. Batting cages.
- E. Pickleball nets and posts.
- F. Volleyball system.
- G. Electronic touch screen control system.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Ensure that large components can be moved into final position without damage to other construction.
  - 2. Coordinate installation of inserts and anchors that must be built in to flooring or subflooring.
  - 3. Coordinate location and electrical characteristics of service connection.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
  - 1. Electrical characteristics and connection locations.

2. Fire rating certifications.
  3. Structural steel welder certifications.
  4. Manufacturer's installation instructions.
- C. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gage of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
- D. Erection Drawings: Detailed dimensional requirements for proper location of equipment.
- E. Samples: Submit samples of wall pad coverings in manufacturer's available range of colors.
- F. Operating and maintenance data, for each operating equipment item.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified with minimum three years of experience.
- C. Basis of Design: Specifications and Drawings are based on equipment types by the specified basis of design manufacturer. Equipment types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in dimensions, configurations, and profile are minor, and do not detract substantially from the indicated design intent.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

#### **1.7 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

- B. Provide 10 year manufacturer warranty for gymnasium equipment specified under this Section.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design Manufacturer:
  - 1. Draper, Inc.: [www.draperinc.com/sle](http://www.draperinc.com/sle).
    - a. Equipment types specified in this Section.
- B. Other Acceptable Manufacturers, General:
  - 1. AALCO Athletic Equipment: [www.aalcomfg.com](http://www.aalcomfg.com).
  - 2. Jaypro Sports, LLC: [www.jaypro.com](http://www.jaypro.com).
  - 3. Porter Athletic Equipment Company: [www.porter-ath.com](http://www.porter-ath.com).
  - 4. Substitutions: See Section 016000 - Product Requirements.

### **2.2 GENERAL REQUIREMENTS**

- A. See Drawings for sizes and locations, unless noted otherwise.
- B. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.
- C. Hardware: Heavy duty steel hardware, as recommended by manufacturer.
- D. Electrical Wiring and Components: Comply with NFPA 70; provide UL-listed equipment.
- E. Structural Steel Fabrications: Welded in accordance with AWS D1.1/D1.1M, using certified welders.

### **2.3 GYM CONTROLS**

- A. Electronic touch screen control system:
  - 1. Basis of Design: Draper Smart Gym Control System.
  - 2. Equipment Control: System to control electronic gym equipment including Basketball Backstops, Height Adjusters, Gymnasium Divider Curtains, Overhead Volleyball Systems, Batting Cages, Scoreboards, and other equipment indicated on drawings.

3. Components: Provide processor assembly, up to two wireless touch screens, and quantity of relay panels appropriate for system control.
4. Coordination: Provide all required power and cabling for system installation.

## **2.4 DIVIDER CURTAINS**

### **A. Gymnasium Divider Curtains:**

1. Curtain Material: Class A rated, self-extinguishing vinyl coated polyester meeting NFPA 101.
2. Operation: Fold up.
3. Size: As indicated on Drawings.
4. Basis of Design:
  - a. Draper Radius Fold Up Divider.

## **2.5 BATTING CAGES**

- ### **A. Type: Electrically operated, gymnasium practice cage including motor, cables, controls, clamps for attachment to building structure, threaded rod supports, and other components required for complete functional installation.**
1. Netting Color: As selected by Architect from manufacturer's standard range.
  2. Basis of Design:
    - a. Draper Bottom-Lifting Practice Cage.

## **2.6 BASKETBALL**

- A. General: Provide equipment complying with requirements in NFHS's "NFHS Basketball Rules Book."**
- B. Source Limitations: Obtain gymnasium dividers and basketball goals from single source from single manufacturer. Basketball goals and gymnasium dividers shall be operated from central gym controls specified.**
- C. Protruding fasteners or exposed bolt heads on front face of backboards are not permitted.**
- D. Provide manufacturer's recommended connections complying with Section 05 50 00 - Metal Fabrications of size and type required to transfer loads to building structure.**
- E. Ceiling-Suspended Backstop Assemblies: Capable of mounting both rectangular and fan-shaped backboards.**

1. Framing: Center strut; forward folding framing.
  2. Folding Control System: Electric hoist that folds backstop with 115 volt actuator, integral limit switches that provide automatic shut-off in both positions, and safety catch with automatic reset.
  3. Height Adjuster: Raises or lowers assembly by 2 feet to adjust goal height.
  4. Height Control System: Electric hoist that adjusts backstop with 115 volt actuator, and integral limit switches that provide automatic shut-off in both positions.
  5. Framing Color: As selected from manufacturer's standard selection.
  6. Basis of Design:
    - a. Draper Basketball Backstop - TBS-26-B.
- F. Backstop Safety Device: Designed to limit free fall if support cable, chains, pulleys, fittings, winch, or related components fail; with mechanical automatic reset; 6000-lb (2722-kg) load capacity; one per folding backstop.
1. Retractor Device: Manufacturer's standard device designed to retract both support and safety cables, chains, and straps away from play of the basketball when backstop is in playing position; one per folding backstop.
- G. Backstop Electric Operator: Provide operating machine of size and capacity recommended by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.
- H. Backboards:
1. Dimensions - Main Court Backboards: 42 inches high by 72 inches wide
  2. Backboard Material: With predrilled holes or preset inserts for mounting goals, and as follows:
    - a. Glass: Not less than 1/2-inch-thick, transparent tempered glass complying with ASTM C 1048 Kind FT (fully tempered) and with impact testing requirements in 16 CFR 1201 Category II or ANSI Z97.1 Class A for safety glazing. Provide glass and framing system manufactured to comply with FIBA Level 1 or Level 2 requirement that glass does not split off if broken. Provide glass with impact-absorbing resilient rubber or PVC gasket around perimeter in a fully welded, painted steel frame, with steel subframe, reinforcement, bracing, and mounting slots for mounting backboard frame to backboard support framing.

- 1) Standard Mount: Provide steel corner reinforcement with mounting slots for mounting backboard frame to backstop at standard mounting centers. Provide center-strut frame reinforcement.
  - b. Target Area and Border Markings: Permanently etched in white color, marked in manufacturer's standard pattern and stripe width.
  - c. Finish: Manufacturer's standard factory-applied, white background.
3. Basis of Design: Draper EZ Fold 503136.
- I. Goal Mounting Assembly: Compatible with goal, backboard, and support framing; with hole pattern 5 inches o.c. horizontally and 4-1/2 inches o.c. vertically that is manufacturer's standard for goal attachment.
1. Glass Backboard Goal Mounting Assembly: Goal support framing and reinforcement designed to transmit load from goal to backboard frame and to minimize stresses on glass backboard.
- J. Basketball Goals: Complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring.
1. Single-Rim Basket Ring Competition Goal: Materials, dimensions, and fabrication per manufacturer's standard design.
  2. Type: Fixed, nonmovable.
  3. Mount: Front.
  4. Net Attachment: No-tie loops for attaching net to rim without tying.
  5. Finish: Manufacturer's standard finish.
  6. Basis of Design: Draper EZ Fold 503576.
- K. Basketball Nets: 12-loop-mesh net, between 15 and 18 inches long, sized to fit rim diameter, and as follows:
1. Cord: Made from white nylon.
- L. Backboard Safety Pads: Designed for backboard thickness indicated and extending continuously along bottom and up sides of backboard and over goal mounting and backboard supports per manufacturer's standard design.
1. Attachment: Bolt on.
  2. Color: As selected by Architect from manufacturer's full range.
  3. Basis of Design: Draper Safe-Edge Padding 5032XX.

## 2.7 CEILING-MOUNTED VOLLEYBALL

- A. General: Provide equipment complying with requirements NFHS's "NFHS Volleyball Rules Book".
- B. Source Limitations: Obtain ceiling-mounted volleyball system from single source from single manufacturer. System shall be operated from a central control panel.
- C. Provide manufacturer's recommended connections complying with Section 05 50 00 - Metal Fabrications of size and type required to transfer loads to building structure.
- D. Ceiling Suspended Volley Ball Net Assemblies: Configuration of court system as indicated on drawings of adjustable posts, net, and tensioning winch meeting all requirements for FIVB, USA Volleyball, NCAA and NFHS competition requirements.
  - 1. Type: Overhead volleyball system shall be two independent, welded support frames constructed from steel mechanical tubing.
  - 2. Support Frame: Each main support frame shall have 4" OD 11-gauge front steel tubing and formed 1- 1/2" OD 11-gauge back brace with 1/4" x 2" HR steel Intermediate support truss supports. Each support frame shall have stabilizing foot consisting of 3 1/2" OD aluminum telescopic inner tubes that are lowered and locked into position using internal threaded rod and gear assemblies.
  - 3. Folding Brace: The folding side braces shall be jackknife type, fully adjustable, self-locking in the down position.
  - 4. Net Attachment: Each support frame shall have a sliding net attachment post to allow infinite height adjustment from 6 feet to 8 feet 4 inches.
  - 5. Net Tensioning Winch: One net attachment post shall incorporate a heavy-duty, self-locking worm gear mechanism.
  - 6. Volleyball Net: Fabricated from high quality 4 inch square mesh made of 2.5 mm black knotless nylon.
    - a. Basis of Design: Draper Net 500014.
  - 7. Protection Pads: Removable, rectangular protection pads with hinged corners to be attached to standards to protect players;
    - a. Color: As selected by architect from manufacturer's standard range.
  - 8. Basis of Design:
    - a. Draper Overhead Volleyball System.

## **2.8 FLOOR-MOUNTED PICKLEBALL**

- A. Pickelball Nets and Posts: Two Pole, Single Court Pickleball System with standards, net and center tie down strap and anchor.
1. Standards: 2-3/8 inch OD 3/16 inch wall high strength steel mechanical tubing furnished with all necessary hardware.
  2. Net: #36 nylon 1-3/4 inch mesh. Double reinforced white vinyl coated nylon headband with enclosed top cable. Bottom and side include nylon reinforced bindings.
  3. Floor Sleeves for Posts: Metal sleeve, with latch cover, cast into concrete subfloor to hold poles for nets and goals; installed flush with finish floor surface.
  4. Basis of Design;
    - a. Draper Sleeve Style Pickleball Systems 502300.

## **2.9 WALL PADDING**

- A. Wall Padding: Foam filling bonded to backing board, wrapped in covering; each panel fabricated in one piece.
1. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84 as a complete panel.
  2. Covering: Vinyl-coated polyester fabric, mildew and rot resistant.
    - a. Color: As selected from manufacturer's standard range.
    - b. Texture: Embossed leather-look.
    - c. Fabric Weight: 14 oz/sq yd.
  3. Foam: Urethane, soft, 3.5 pcf nominal density.
  4. Foam Thickness: 2 inches.
  5. Backing Board: Plywood.
    - a. Thickness: 7/16 inch.
    - b. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84.
  6. Panel Dimensions: As indicated in drawings.



7. Nailing Margins: 1 inch wide, covered by fabric covering.
8. Mounting: Removable; Z-clips fixed to wall and to padding.
9. Cut-out Trim: Provide manufacturer's standard flanged cut-out trim kits for fitting pads around switches, receptacles, and other obstructions.
10. Basis of Design: Draper EcoVision Wall Pads.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation. Notify Architect in writing of unsatisfactory or detrimental conditions. Do not proceed until conditions have been corrected. Commencing installation constitutes acceptance of work site conditions.
- C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.
- D. Verify that electrical services are correctly located and have proper characteristics.

#### **3.2 INSTALLATION**

- A. Install in accordance with Contract Documents and manufacturer's instructions.
- B. Install equipment rigid, straight, plumb, and level.
- C. Secure equipment with manufacturer's recommended anchoring devices.
- D. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.
- E. Separate dissimilar metals to prevent electrolytic corrosion.

#### **3.3 ADJUSTING**

- A. Verify proper placement of equipment.
- B. Verify proper placement of equipment anchors and sleeves. Use actual movable equipment to be anchored if available.
- C. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration. Lubricate equipment if recommended by manufacturer.

**3.4 CLEANING**

- A. Remove masking or protective covering from finished surfaces.
- B. Clean equipment in accordance with manufacturer's recommendations.

**3.5 PROTECTION**

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

**END OF SECTION 116000**

## **SECTION 116643 - INTERIOR SCOREBOARDS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Gymnasium scoreboards.

#### **1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate with Division 26 installer for conduit rough-in for scoreboard systems.

#### **1.3 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for each equipment item, describing installation requirements, construction features, accessory components, and other pertinent data.
- C. Shop Drawings: Indicate each equipment item showing sizes, dimensions, layouts, setting layouts, and required anchorage based on actual field measurements.
- D. Operation and Maintenance Data: Submit data for each equipment item, including spare parts lists and manufacturer's printed warranties.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.4 QUALITY ASSURANCE**

- A. Provide each type of equipment from a single manufacturer, and to the extent possible, provide all equipment by a single manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with not less than three years of documented experience.
- C. Basis of Design: Specifications are based on scoreboard types and model numbers by the specified manufacturer for each equipment item. Scoreboard types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in dimensions and configuration are minor, and do not detract substantially from the indicated design intent.
- D. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

#### **1.5 FIELD CONDITIONS**

- A. Do not install scoreboards until finish work is complete, including floor systems.

- B. Furnish inserts and anchoring devices which must be set in concrete or other materials for installation of scoreboards. Coordinate delivery to avoid delays in the work.

## **1.6 WARRANTY**

- A. See Section 017800 - 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. Basis of Design:
  - 1. Nevco; Model 2700: [www.nevco.com](http://www.nevco.com)
- B. Other Acceptable Manufacturers:
  - 1. Daktronics, Inc: [www.daktronics.com](http://www.daktronics.com)
  - 2. OES Scoreboards, Inc: [www.oesscoreboards.com](http://www.oesscoreboards.com).
  - 3. Substitutions: See Section 016000 - Product Requirements.

### **2.2 GYMNASIUM SCOREBOARDS**

- A. General Information:
  - 1. Dimensions: 3 feet high by 8 feet wide by 8 inches deep, nominal.
  - 2. Colors: To be selected by Architect from manufacturer's full line.
- B. Construction:
  - 1. Cabinet Material: Aluminum.
    - a. Scoreboard back, face, and perimeter: 0.050 inch thick minimum.
  - 2. Capable of withstanding high-velocity impact from air-filled sports balls without protective screens.
- C. Digits & Indicators:
  - 1. LED Digit Technology:
    - a. Discrete LED's protruding through scoreboard face.
  - 2. LED Colors: As selected by Architect from manufacturer's standard options.
  - 3. Digit Sizes:

- a. Clock and Score Digits: 13 inches high.
  - b. PERIOD Digits: 9-10 inches high.
  - c. Bonus Indicators: 4 inches high.
  - d. Possession Arrows: 3 inches high.
  - e. Seven bar segments per digit.
- D. Captions:
1. Vinyl, applied directly to scoreboard face.
  2. Sizes:
    - a. HOME and GUEST: 6 inches high.
    - b. PERIOD: 4-6 inches high.
  3. Color: Standard white.
- E. Horn:
1. Vibrating horn mounted inside scoreboard cabinet.
    - a. Sounds automatically when period clock counts down to zero.
    - b. Sounds manually as directed by operator.
- F. Power Cord:
1. 11 feet long, nominal.
  2. Configured for standard 120V grounded outlet.

### **2.3 SCORING CONSOLE**

- A. Scores multiple sports using changeable keyboard inserts.
- B. Controls multiple scoreboards, stats displays and shot clocks.
- C. Recalls clock, score, and period information if power is lost.
- D. Runs Time of Day and Segment Timer modes.
- E. Console: Wired.
  1. Enclosure: Aluminum.

## **2.4 ACCESSORIES**

- A. Furnish anchors, trim, and electronic accessories as required for complete, functional installation of each scoreboard system.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Provide setting drawings, templates, instructions, and directions for installation of scoreboard systems.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Set units in position plumb, square, level, and properly aligned with other elements of the building and game court layouts as finally approved or installed.
- C. Secure to building construction as detailed or required and anchor by welding, bolting, or other suitable means as indicated or as recommended by manufacturer.

### **3.3 CLEANING**

- A. Clean, test, and adjust to assure proper operation and control.

**END OF SECTION 116643**

## **SECTION 122400 - ROLLER WINDOW SHADES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Window shades and accessories.
- B. Electric motor operators.
- C. Motor controls.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; 2019.
- B. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- D. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate with window installation and placement of concealed blocking to support shades.
- B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this Section; require attendance of all affected installers.
- C. Sequencing:
  - 1. Do not fabricate shades until field dimensions for each opening have been taken.
  - 2. Do not install shades until final surface finishes and painting are complete.

#### **1.4 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, and operation direction.
- D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E. Selection Samples: Where shade cloth is not scheduled, include fabric samples in full range of available colors and patterns.
- F. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- I. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- J. Maintenance contracts.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than five years of experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum five years of experience.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

#### **1.7 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### **1.8 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:



1. Manufacturer's standard non-depreciating 25 year limited warranty.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers - Roller Shades:
  1. Draper, Inc.: [www.draperinc.com/sle](http://www.draperinc.com/sle).
  2. Hunter Douglas Architectural: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  3. MechoShade Systems, Inc.: [www.mechoshade.com](http://www.mechoshade.com).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

### **2.2 WINDOW SHADE APPLICATIONS**

- A. Shades: Types as Scheduled.
  1. Type: Roll down, closed position is at window sill.
  2. Color: As selected by Architect from manufacturer's full range of colors.
  3. Mounting: Inside (between jambs).
  4. Operation: Manual and motorized, in locations indicated.

### **2.3 ROLLER SHADES**

- A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.
  1. Drop: Regular roll.
  2. Size: As indicated on drawings.
- B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
  1. Flammability: Pass NFPA 701 large and small tests.
  2. Fungal Resistance: No growth when tested according to ASTM G21.
- C. Roller Tubes: As required for type of operation.
  1. Material: Extruded aluminum or galvanized steel; as required for shade location.

2. Size: Manufacturer's standard, selected for suitability for installation conditions, span, and weight of shades.
  3. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
  4. Finish: Baked enamel; color from manufacturer's standards.
  5. Take-Up Roller: Manufacturer's standard roller tube pre-tensioned for winding lift cable in bottom-up type shades.
- D. Hembars: Designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.
1. Style: Manufacturer's standard concealed hembar, flat profile with closed ends.
- E. Manual Operation for Interior Shades: Clutch operated continuous loop; beaded ball chain.
- F. Motor Operation: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed to UL 325.
1. Audible Noise: Maximum 39 dBA measured 3 feet from the motor unit; no audible clicks when motor starts and stops.
  2. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view.
  3. Motor Type: Both AC and DC motors are acceptable; provide required transformers for DC motors.
  4. Coupling of Multiple Shades: Where possible, minimize number of motors by coupling adjacent shades.
  5. Control Compatibility: Fully compatible with the controls to be installed.

## **2.4 MOTOR CONTROLS**

- A. Motorized shades, unless otherwise indicated, to be controlled by wall-mounted controls and wireless (RF) handheld remote controls as specified below.
- B. Control Requirements:
1. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.

2. Capable of controlling shade speed for tracking within plus or minus 0.0625 inch throughout entire travel.
  3. Capable of stopping within accuracy of 0.125 inch at any point between open and close limits.
  4. Capable of assigning shades to groups and subgroups without rewiring.
  5. Capable of storing up to 250 programmable stop points, including open, close, and any other position.
  6. Provide 10 year power failure memory for preset stops, open and close limits, shade grouping and subgrouping and system configuration.
  7. Capable of synchronizing multiple units of the same size to start, stop and move in unison.
  8. Provide all components and connections necessary to interface with other systems as indicated.
- C. Wall-Mounted Controls: UV stabilized visible parts meeting ASTM D4674; furnished with backlit buttons; provided by shade manufacturer.
1. Control Functions:
    - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
    - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
    - c. Raise: Raise controlled shade(s) only while button is pressed.
    - d. Lower: Lower controlled shade(s) only while button is pressed.
    - e. Stop shade(s) in motion by tap on any button.
    - f. Presets: Provide button(s) as indicated for selection of programmable scenes.
    - g. Multiple Shade Groups: Provide individual controls for each shade group as indicated.
  2. Finish: To be selected by Architect.
  3. Button Engraving: Manufacturer's standard engraving, unless otherwise indicated.
- D. Wireless (Radio Frequency) Handheld Remote Control: Battery-powered; provided by shade manufacturer.

1. Wireless Range: 30 feet.
2. Control Functions:
  - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
  - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
  - c. Raise: Raise controlled shade(s) only while button is pressed.
  - d. Lower: Lower controlled shade(s) only while button is pressed.
  - e. Preset: Provide button for selection of programmable scene.
3. Finish: White.

## **2.5 ACCESSORIES**

- A. Fascias: Size as required to conceal shade mounting.
  1. Finish: Painted finish, color as selected by Architect.
- B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.
- C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

## **2.6 FABRICATION**

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate shades to fit openings within specified tolerances.
  1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window sill.
  2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.

- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

### **3.2 PREPARATION**

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

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, using mounting devices as indicated.
- B. Installation Tolerances:
  - 1. Inside Mounting: Maximum space between shade and jamb when closed of 1/16 inch.
  - 2. Maximum Offset From Level: 1/16 inch.
- C. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- D. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

### **3.4 CLEANING**

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

### **3.5 PROTECTION**

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 122400**



## **SECTION 123600 - COUNTERTOPS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#244} - {t\#244}.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. AWI (QCP) - Quality Certification Program; Current Edition.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- F. PS 1 - Structural Plywood; 2023.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizing and configuration of countertops with associated casework and adjacent construction.
  - 2. Coordinate sizing and locations of cutouts for plumbing fixtures with base cabinet configurations for proper alignments as indicated on Drawings.

#### **1.5 SUBMITTALS**

- A. See Section 013000 - 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.

- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other Sections.
  - 1. Indicate plans, sections, dimensions, seam locations, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in countertops.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Installation Instructions: Manufacturer's installation instructions and recommendations.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

#### **1.6 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than three years of documented experience.
- C. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of Section 06 41 00.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

#### **1.8 FIELD CONDITIONS**

- A. Comply with requirements of Section 06 41 00.



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

## **1.9 WARRANTY**

- A. Solid Surface Material Manufacturer Warranty: Provide manufacturer's standard warranty for solid surface material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

## **PART 2 PRODUCTS**

### **2.1 COUNTERTOPS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
  - 1. Flat Sheet Thickness: 1/2 inch, minimum.
  - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    - b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
    - c. Color and Pattern: As scheduled on Drawings.
  - 3. Other Components Thickness: 1/2 inch, minimum.
  - 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
  - 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
  - 6. Skirts: As indicated on Drawings.
  - 7. Fabricate in accordance with manufacturer's standard requirements.

## 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. Countertop and Workstation Brackets:
  - 1. Material: Steel or aluminum.
  - 2. Load Capacity Per Bracket: 450 pounds.
  - 3. Finish: Manufacturer's standard, factory-applied powder coat.
  - 4. Color: Selected by Architect from manufacturer's standard range.
  - 5. Products: See drawings for types and locations.
    - a. A&M Hardware, Inc ; Concealed Brackets:  
<http://www.aandmhardware.com>.
    - b. A&M Hardware, Inc ; Standard Brackets:  
<http://www.aandmhardware.com/#sle>.
    - c. Rangine Corporation; Rakks EH-Inside Wall Mount - Counter Support Brackets; [www.rakks.com](http://www.rakks.com).
    - d. Rangine Corporation; Rakks EH-Surface Wall Mount - Counter Support Brackets; [www.rakks.com](http://www.rakks.com).
    - e. Substitutions: See Section 016000 - Product Requirements.
- D. Americans with Disabilities Act (ADA)-Compliant Vanity and Countertop Brackets:
  - 1. Material: Steel or aluminum.
  - 2. Finish: Manufacturer's standard, factory-applied powder coat.
  - 3. Color: Selected by Architect from manufacturer's standard range.
  - 4. Products:
    - a. A&M Hardware, Inc ; ADA Vanity Brackets:  
<http://www.aandmhardware.com/#sle>.
    - b. Rangine Corporation; Rakks ADA Vanity Brackets; [www.rakks.com](http://www.rakks.com).
    - c. Substitutions: See Section 016000 - Product Requirements.

- E. Joint Sealant: Mildew-resistant silicone sealant, clear.

## 2.3 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  - 1. Join lengths of tops using best method recommended by manufacturer.
  - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  - 1. Secure to walls with contact surfaces set in waterproof adhesive.
  - 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
  - 1. Arrange seams symmetrically or in orderly locations, minimum 12 inches from edges of sink and similar cutouts.
- D. Cutouts and Holes:
  - 1. Undercounter Fixtures: Make cutouts for undercounter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
  - 2. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
  - 3. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
  - 4. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
- E. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on Drawings, finished to match.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that blocking/backing has been installed prior to installation of countertop brackets and prefabricated vanities.
- 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.
- D. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.
- E. Verify actual site dimensions and location of adjacent materials prior to commencing work.
- F. Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0"

### **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 to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach wood countertops and wood substrates using screws with minimum penetration into substrate board of 5/8 inch.
- C. Attach countertops using compatible adhesive.
- D. Set countertops to comply with requirements indicated. Shim and adjust to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and other attachments indicated or necessary to secure countertops in place.
- E. Bond joints with countertop manufacturer's recommended adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- F. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

- G. 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.
- C. Field Joints: 1/8 inch wide, maximum.

### **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 123600**



## **SECTION 133419 - PRE-ENGINEERED 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 and roof mounted equipment curbs.

#### **1.2 RELATED REQUIREMENTS**

- A. Section {id\#3948} - {t\#3948}: Sealing joints between accessory components and wall system.
- B. Section {id\#369} - {t\#369}.

#### **1.3 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
- C. AISC 360 - Specification for Structural Steel Buildings; 2022.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- H. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2019.
- I. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- J. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

- L. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024.
- M. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- O. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2018).
- P. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems; 2016 (Reapproved 2022).
- Q. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
- R. 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; 2023.
- S. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- T. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021, with Errata (2023).
- U. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- V. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2018, with Editorial Revision (2019).
- W. MBMA (MBSM) - Metal Building Systems Manual; 2019.
- X. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- Y. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate installation of roofing system and related flashings



2. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- B. Post-Bid Design-Assist Meeting: Convene after bidding and before contract award to discuss scope, design and performance requirements,
1. Required Attendance: Contractor, Pre-Engineered Metal Building Subcontractor, Owner, Architect, and manufacturer's technical representative.
- C. Preinstallation Meeting: Convene two weeks before starting work of this section.
1. Prior to erection of framing, conduct pre-installation meeting at site attended by Owner, Architect, manufacturer's technical representative, inspection agency and related trade contractors.
  2. Review methods and procedures related to pre-engineered metal building installation, including manufacturer's written instructions.
  3. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction.
  4. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  5. Review temporary protection requirements during and after installation.
  6. Review procedures for repair of metal panels damaged after installation.

## **1.5 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.
- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.
- D. Samples: Submit two samples of precoated metal panels for each color selected, 6 by 6 inch in size illustrating color and texture of finish.
- E. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

- F. Structural design calculations sealed and signed by a professional engineer licensed in accordance with applicable state law.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
  - 1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.
- I. Erector's Qualification Statement.
- J. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

#### **1.6 QUALITY ASSURANCE**

- A. 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 Work.
  - 1. Design Engineer: 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.
- B. Perform work in accordance with AISC 360, MBMA (MBSM), AISC 360, MBMA (MBSM), AISC 360, and MBMA (MBSM).
- C. Material Testing: Metal building system manufacturer shall provide, upon request at time of order, evidence of compliance with specifications through testing.
- D. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
  - 1. Not less than three years of documented experience.
  - 2. Accredited by IAS in accordance with IAS AC472.
- E. Erector Qualifications: Company specializing in performing the work of this Section, AISC Certified, with minimum five years experience.

- F. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store packaged products in original, unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials in accordance with requirements of the authority having jurisdiction.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

## **1.8 PROJECT CONDITIONS**

- A. Do not install systems when temperature, humidity, or ventilation is outside of limits recommended by manufacturer.

## **1.9 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide 20 year manufacturer warranty for metal finishes.
  - 1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Butler Manufacturing Company: [www.butlermfg.com](http://www.butlermfg.com).
  - 2. Chief Buildings: [www.chiefbuildings.com/sle](http://www.chiefbuildings.com/sle).
  - 3. Nucor Building Systems: [www.nucorbuildingsystems.com](http://www.nucorbuildingsystems.com).
  - 4. VP Buildings: [www.vp.com](http://www.vp.com).
  - 5. Substitutions: Not permitted.

## 2.2 ASSEMBLIES

- A. Primary Framing: Rigid frame of rafter beams and columns, braced end frames, and wind bracing.
- B. Secondary Framing: Purlins, Girts, Sill supports, and Clips, and other items detailed.
- C. Wall System: Preformed metal panels of horizontal profile, with sub-girt framing/anchorage assembly and insulation, and accessory components.
- D. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly and insulation, and accessory components.
- E. Roof Slope: As indicated in Drawings.

## 2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design pre-engineered metal building, including comprehensive engineering analysis by a qualified professional engineer registered in the State in which the Project is located, using specified performance requirements and design criteria.
- B. General: Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- C. Envelope Performance:
  - 1. Wall System U-value: 0.050 Btu/(hr sq ft deg F), maximum.
  - 2. Roof System U-value: 0.035 Btu/(hr sq ft deg F), maximum.
- D. Structural Design Requirements: Refer to Structural Sheet S0.01.
- E. Special Design Requirements:
  - 1. Sag Rods and Sag Strips: Second wall girts and roof purlins are not permitted to have sag rods or sag straps. Secondaries must support their own self weight meeting deflection criteria noted on Sheet S0.01
  - 2. Bottom Flange Bracing: Primary steel tapered frame sections bottom flange bracing is not permitted. Primary steel tapered column sections interior-side bracing is permitted at a spacing no less than 10'-0" O.C.
  - 3. Wall zee girts shall have inside facing toe oriented downwards.
  - 4. Exposed fastener points and exposed fasteners are not permitted within the first 15'-0" above finish floor from panels through zee girts.
- F. Air Infiltration:

1. Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E1680 or ASTM E283/E283M at the following test-pressure difference:
    - a. Test-Pressure Difference: 1.57 lbf/sq. ft.
  2. Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283/E283M at the following test-pressure difference:
    - a. Test-Pressure Difference: 1.57 lbf/sq. ft.
- G. Water Penetration:
1. Metal Roof Panels: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
    - a. Test-Pressure Difference: 6.24 lbf/sq. ft.
  2. Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
    - a. Test-Pressure Difference: 6.24 lbf/sq. ft.
- H. Drainage: Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- I. Thermal Movements: Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 deg F, ambient; 180 deg F, material surfaces degrees F.
- J. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

## **2.4 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 F1554, Grade 55, Class 1A, with hot dip type for protective coating.
- 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 zinc rich.

## 2.5 MATERIALS - WALLS AND ROOF

- A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Designation SS (structural steel), Grade 33 (230), with G90/Z275 coating.
- B. Batt Insulation With Integral Vapor Retarder: Flexible preformed batt or blanket, complying with ASTM C665; integral, self-extinguishing vapor retarder fabric lining.
  - 1. Complies with fire-resistance requirements specified; tested for compliance in accordance with NFPA 701, large scale.
  - 2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 3. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
  - 4. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
  - 5. Thermal Resistance, Walls: Double layer; R-25 + R-8.
  - 6. Thermal Resistance, Roof: Double layer; R-25 + R-10 + R-3 thermal spacers.
  - 7. Vapor Barrier Liner Fabric: Woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film, as specified.
    - a. Permeance of Fabric and Seams: 0.025 perms.
    - b. Size and Seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
    - c. Stapled seams not acceptable.
    - d. Factory-folded to allow for rapid pull-out on strap support system.
    - e. Color: White.
  - 8. Acceptable Manufacturer:
    - a. Silvercote Energy Saver Banded Fabric Liner Wall and Roof Insulation.
    - b. Substitutions: See Section 016000 - Product Requirements.
- C. Joint Seal Gaskets: Manufacturer's standard type.
- D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- E. Bituminous Paint: Asphaltic type.
- F. Sealant: Manufacturer's standard type.

- G. Roof Curbs: Insulated metal same type and finish as roofing, 18 gauge, 0.048 inch thick, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.
  - 1. Insulate inside curbs with 3 inch thick fiberglass insulation.
  - 2. Height Above Finished Roof Surface: 12 inches.
- H. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

## 2.6 COMPONENTS

- A. Hollow Metal Doors and Frames: See Section 081113.
- B. Overhead Doors: Specified in Section 083323.
- C. Storefront System: See Section 084113.
- D. Curtainwall System: See Section 084413.
- E. Fence Type Snow Guard: Continuous snow guard; manufacturer's standard single pipe, bar, channel, or solid rod, set in brackets or posts, with optional plates and optional metal trim to match roof.
  - 1. Pipe or Tube: Powder coating with color to match roof.
    - a. Outside Diameter, Round: 1 inch, nominal.
    - b. Threaded Couplings: Match pipe or tube, manufacturers standard.
    - c. Sleeve Couplings: Manufacturer's standard material.
    - d. End Collars and Caps: Metal to match tube.
  - 2. Supplemental Plates and Clips: Attached to horizontal component; match finish of pipe, tube, rod, or channel.
  - 3. Clamps for Standing Seam Roof: Stainless steel or aluminum clamps and required accessory components designed specifically for attachment to standing seams of roof panels; for attachment of fence type snow guard.
    - a. Clamp Spacing: Every panel seam; maximum spacing of 24 inches.
  - 4. Acceptable Manufacturers:
    - a. Alpine SnowGuards: [www.alpinesnowguards.com/#sle](http://www.alpinesnowguards.com/#sle).
    - b. Berger Building Products: [www.bergerbp.com](http://www.bergerbp.com).

- c. LMCurbs: [www.lmcurbs.com/#sle](http://www.lmcurbs.com/#sle).
- d. Metal Roof Innovations, Ltd. S-5! Attachment Solutions: [www.s-5.com/sle](http://www.s-5.com/sle).
- e. PMC Industries, Inc: [www.aceclamp.com/#sle](http://www.aceclamp.com/#sle).
- f. Rocky Mountain Snow Guards, Inc.: [www.rockymountainsnowguards.com](http://www.rockymountainsnowguards.com).
- g. TRA Snow and Sun: [www.trasnowandsun.com/#sle](http://www.trasnowandsun.com/#sle).
- h. Substitutions: See Section 016000 - Product Requirements.

## **2.7 FABRICATION - FRAMING**

- A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.
- C. Provide wall opening framing for doors, windows, mechanical equipment, and other accessory components.

## **2.8 FABRICATION - WALL AND ROOF PANELS**

- A. Wall Panels:
  - 1. Profile: AVP pencil rib panel with lapped edges fitted with continuous gaskets.
  - 2. Material: Precoated steel sheet, 24 gauge minimum thickness.
  - 3. Panel Width: 36 inches.
  - 4. Panel Depth: 1-1/8 inches.
  - 5. Finish: Superior performing organic coating (PVDF).
  - 6. Color: As selected by Architect from manufacturer's standard line.
  - 7. Basis of Design:
    - a. MBCI; AVP Panel.
- B. Roof Panels:
  - 1. Profile: Double-Lok trapezoidal leg with lapped edges fitted with continuous gaskets.
  - 2. Material: Precoated steel sheet, 24 gauge minimum thickness.
  - 3. Panel Width: 18 inches.



4. Finish: Superior performing organic coating (PVDF).
5. Color: As selected by Architect from manufacturer's standard line.
6. Basis of Design:
  - a. MBCI; Double Lok.
- C. Liner: Sheet metal, flat profile indicated, lapped V edges fitted with continuous gaskets.
- D. Girts and Purlins: Rolled formed structural shape to receive siding, roofing sheet.
  1. Member Depth (Outset): 9 inches.
- E. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles.
- F. Flashings, Closure Pieces, Fascia, Infills, and Caps: Same material and finish as adjacent material, profile formed as detailed.
- G. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

## **2.9 FABRICATION - GUTTERS AND DOWNSPOUTS**

- A. Fabricate of same material and finish as roofing metal.
- B. Form gutters and downspouts and scuppers of rectangular profile and size indicated to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.
- E. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).

## **2.10 FINISHES**

- A. Primary Framing Members: Clean, prepare, and prime to SSPC Manual requirements. Do not prime surfaces to be field welded. Provide SSPC-SP2 minimum.
- B. Secondary Framing Members: Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.

- C. Exterior Metal Finishes: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch.

### **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. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners.
- G. Install sealant and gaskets, providing weather tight installation.

#### **3.4 ERECTION - GUTTERS AND DOWNSPOUTS**

- A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.

- C. Slope gutters minimum 1/4 inch per 10 feet.
- D. Connect downspouts to storm sewer system.
- E. Install splash pans under each downspout where downspouts are not connected to storm sewer system.

### **3.5 INSTALLATION - INSULATION**

- A. General: Install insulation in accordance with manufacturer's written instructions to achieve specified U-value.
- B. Insulation:
  - 1. Install thermal breaks to exterior surface of girts.
  - 2. Ensure that cavities are filled completely with insulation.
  - 3. Cut insulation to required lengths to fit vertically between girts and purlins.
  - 4. Neatly position in place and secure to hangers.
  - 5. Fluff the insulation to exceed the specified thickness.
  - 6. Ensure that vapor barrier fabric is continuously sealed.

### **3.6 INSTALLATION - ACCESSORY COMPONENTS IN WALL SYSTEM**

- A. Install door frames, doors, overhead doors, and fenestration systems in accordance with manufacturer's instructions.

### **3.7 TOLERANCES**

- A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- B. Siding and Roofing: 1/8 inch from true position.

### **3.8 PROTECTION**

- A. Protect installed products until Substantial Completion.

**END OF SECTION 133419**



**SECTION 210500  
COMMON WORK RESULTS FOR FIRE SUPPRESSION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Above ground piping.
- B. Escutcheons.
- C. Mechanical couplings.
- D. Pipe hangers and supports.
- E. Pipe sleeves.
- F. Pipe sleeve-seal systems.
- G. Piping specialties.
- H. Pressure gauges.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 210523 - General-Duty Valves for Water-Based Fire-Suppression Piping.
- C. Section 211300 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

**1.03 REFERENCE STANDARDS**

- A. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
- B. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
- C. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
- D. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2020.
- E. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- F. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2021.
- G. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard; 2020.
- H. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- I. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984, with Editorial Revision (2019).
- J. ASTM A795/A795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use; 2021.
- K. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2022a.
- L. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- M. AWWA C606 - Grooved and Shouldered Joints; 2022.
- N. FM (AG) - FM Approval Guide; Current Edition.
- O. ITS (DIR) - Directory of Listed Products; Current Edition.
- P. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. NFPA 1963 - Standard for Fire Hose Connections; 2019.
- R. UL (DIR) - Online Certifications Directory; Current Edition.

- S. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
- T. UL 405 - Standard for Safety Fire Department Connection Devices; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information. Indicate valve data and ratings.
- C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, and floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
  - 1. Minimum three years experience.
- C. Comply with FM (AG), UL (DIR), and ITS (DIR) or Warnock Hersey requirements.
- D. Valves: Bear FM (AG), UL (DIR), and ITS (DIR) or Warnock Hersey product listing label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.
- F. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store valves in shipping containers, with labeling in place.
- 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.

#### **1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Sprinkler-based System:
  - 1. Comply with NFPA 13.
  - 2. See Section 211300.
- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- C. Provide system pipes, fittings, sleeves, escutcheons, seals, and other related accessories.

#### **2.02 ABOVE GROUND PIPING**

- A. Steel Pipe: ASTM A795 Schedule 40, black.
  - 1. Steel Fittings: ASME B16.5 steel flanges and fittings.
  - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
  - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.

4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

### 2.03 PIPE SLEEVES

- A. Vertical Piping:
  1. Sleeve Length: 1 inch (25 mm) above finished floor.
  2. Provide sealant for watertight joint.
- 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 Quarry Tile, Terrazzo, or Ceramic Tile Floors:
  1. Brass pipe.
  2. Connect sleeve with floor plate.
- D. Not required for wall hydrants for fire department connections or in drywall construction.
- E. Clearances:
  1. Provide allowance for insulated piping.
  2. Wall, Floor, Floor, Partitions, and Beam Flanges: 1 inch (25 mm) greater than external; pipe diameter.
  3. Rated Openings: Caulked tight with firestopping material complying with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

### 2.04 PIPE SLEEVE-SEAL SYSTEMS

- A. Modular Mechanical Seals:
  1. Elastomer-based interlocking links to 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 with service requirements.
  4. Service Requirements:
    - a. Underground, buried, and wet conditions.
  5. Glass-reinforced plastic pressure end plates.
- B. Wall Sleeve: PVC material with waterstop collar, and nailer end caps.
- C. Sleeve-Forming Disk: Nonconductive plastic-based material, 3 inch (76.2 mm) thick.
- D. Pipeline-Casing Seals:
  1. End Seals: 1/8 inch (3.1 mm), pull-on type, rubber or synthetic rubber based.

### 2.05 ESCUTCHEONS

- A. Material:
  1. Fabricate from nonferrous metal.
  2. Chrome-plated.
  3. Metals and Finish: Comply with ASME A112.18.1.
- B. Construction:
  1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
  2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

### 2.06 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm): Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.

- C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- D. Wall Support for Pipe Sizes to 3 inches (80 mm): Cast iron hook.
- E. Wall Support for Pipe Sizes 4 inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
- F. Vertical Support: Steel riser clamp.
- G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

## 2.07 MECHANICAL COUPLINGS

- A. Manufacturers:
  - 1. Anvil International; \_\_\_\_\_: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Tyco Fire Protection Products; \_\_\_\_\_: [www.tyco-fire.com/#sle](http://www.tyco-fire.com/#sle).
  - 3. Victaulic Company; FireLock Style 009H: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).
- B. Rigid Mechanical Couplings for Grooved Joints:
  - 1. Dimensions and Testing: Comply with AWWA C606.
  - 2. Minimum Working Pressure: 300 psig (2065 kPa).
  - 3. Housing Material: Fabricate of ductile iron complying with ASTM A536.
  - 4. Housing Coating: Factory applied orange enamel.
  - 5. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F (minus 34 degrees C) to 230 degrees F (110 degrees C).
  - 6. Bolts and Nuts: Hot-dipped-galvanized or zinc-electroplated steel.

## 2.08 PIPING SPECIALTIES

- A. Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber-faced clapper to automatically actuate water motor alarm, pressure retard chamber and variable pressure trim with the following additional capabilities and features:
  - 1. Activate electric alarm.
  - 2. Test and drain valve.
  - 3. Replaceable internal components without removing valve from installed position.
- B. Backflow Preventer: Reduced-pressure principle valve assembly backflow preventer with drain and OS & Y gate valve on each end.
- C. Commercial Riser Manifold: Preassembled and tested riser manifold in accordance with NFPA 13.
- D. Test Connections:
  - 1. Combination Inspector's Test Connection and Drain Valve:
    - a. Provide test connections approximately 6 feet (2 m) above floor for each or portion of each sprinkler system equipped with an alarm device, located at most remote part of each system.
    - b. Route combination test connection and drain valve to an open-site drain location, excluding janitor sinks, accepting full flow without negative consequences.
    - c. Supply discharge orifice with same size as corresponding sprinkler orifice.
    - d. Limit vertical height of exterior wall penetration to 2 feet (0.61 m) above finished grade.
  - 2. Backflow Preventer Test Connection:
    - a. Provide downstream of the backflow prevention assembly, listed hose valves with 2.5-inch (65 mm) National Standard male hose threads with cap and chain.
    - b. Provide one valve for each 250 gpm (16 L/sec) of system demand or fraction thereof.
    - c. Provide permanent sign reading "Test Valve." See Section 210553.
- E. Water Flow Switch: Vane-type switch for mounting horizontally or vertically, with two contacts; rated 10 A at 125 VAC and 2.5 A at 24 VDC.
- F. Fire Department Connections:



1. Type: Exposed, projected wall mount made of corrosion-resistant metal complying with UL 405.
  - a. Inlets: Two-way, 2-1/2 inch (65 DN) swivel fittings, internal threaded. Thread size and inlets according to NFPA 1963 or authority having jurisdiction. Brass caps with gaskets, chains, and lugs.

## **2.09 PRESSURE GAUGES**

- A. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

### **3.02 INSTALLATION**

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space, to not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
  1. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
  2. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  3. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
  5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- I. Structural Considerations:
  1. Do not penetrate building structural members unless indicated.
- J. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
  1. Underground Piping: Caulk pipe sleeve watertight with lead and oakum or mechanically expandable chloroprene inserts with bitumen sealed metal components.
  2. Aboveground Piping:
    - a. Pack solid using mineral fiber complying with ASTM C592.
    - b. Fill space with an elastomer caulk to a depth of 0.50 inch (15 mm) where penetrations occur between conditioned and unconditioned spaces.
  3. All Rated Openings: Caulk tight with firestopping material complying with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

4. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.
- K. 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 watertight seal.
  6. Install in accordance with manufacturer's recommendations.
- L. Escutcheons:
1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
  2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
  3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.
- M. 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, unions, and couplings for servicing are consistently provided.

### **3.03 CLEANING**

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

**END OF SECTION 210500**

**SECTION 210523**  
**GENERAL-DUTY VALVES FOR WATER-BASED FIRE-SUPPRESSION PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Two-piece ball valves with indicators.
- B. Iron butterfly valves with indicators.
- C. Iron OS&Y gate valves.
- D. Trim and drain valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 210553 - Identification for Fire Suppression Piping and Equipment.
- B. Section 211300 - Fire-Suppression Sprinkler Systems.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. EPDM: Ethylene-propylene diene monomer.
- B. NRS: Non-rising stem.
- C. OS&Y: Outside screw and yoke.
- D. PTFE: Polytetrafluoroethylene.

**1.04 REFERENCE STANDARDS**

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. FM 1112 - Examination Standard for Indicating Valves (Butterfly or Ball Type); 2020.
- D. FM 1120/1130 - Approval Standard for Fire Service Water Control Valves (OS&Y and NRS Gate Valves); 1997.
- E. FM 1140 - Approval Standard for Quick Opening Valves 1/4 Inch through 2 Inch Nominal Size; 1998.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL 258 - Shutoff Valves for Trim and Drain Purposes for Fire Protection Service; Current Edition, Including All Revisions.
- H. UL 262 - Gate Valves for Fire-Protection Service; Current Edition, Including All Revisions.
- I. UL 1091 - Standard for Butterfly Valves for Fire-Protection Service; Current Edition, Including All Revisions.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

**1.06 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.
- C. Where listed products are specified, provide products listed, certified, and labeled by FM (AG), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose indicated.
- D. Welding Materials and Procedures: Comply with ASME BPVC-IX.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect valve ends and flange faces.
  - 3. Set valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection and protect flanges and specialties from dirt.
    - a. Provide temporary inlet and outlet caps.
    - b. Maintain caps in place until installation.
  - 2. Store valves in shipping containers and maintain in place until installation.
    - a. Store valves indoors and maintain at higher than ambient dew point temperature.
    - b. If outdoor storage is unavoidable, store valves off the ground in watertight enclosures.
- C. Use the following precautions for handling:
  - 1. Use sling to handle large valves, rig to avoid damage to exposed parts.
  - 2. Do not use operating handles or stems as lifting or rigging points.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Source Limitations: Furnish valves of same kind by same manufacturer.
- B. Valve Pressure Ratings: Not less than minimum pressure rating indicated or higher as required.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.

### **2.02 TWO PIECE BALL VALVES WITH INDICATORS**

- A. UL 1091 and FM 1112 listed.
- B. Description:
  - 1. Minimum Pressure Rating: 175 psig (1200 kPa).
  - 2. Body Design: Two piece.
  - 3. Body Material: Forged brass or bronze.
  - 4. Port Size: Full or standard.
  - 5. Seat: PTFE.
  - 6. Stem: Bronze or stainless steel.
  - 7. Ball: Chrome-plated brass.
  - 8. Actuator: Worm gear or traveling nut.
  - 9. End Connections: Threaded or grooved.

### **2.03 IRON BUTTERFLY VALVES WITH INDICATORS**

- A. UL 1091 and FM 1112 listed.
- B. Minimum Pressure Rating: 175 psig (1200 kPa).

- C. Body Material: Cast or ductile iron.
- D. Seat: EPDM.
- E. Stem: Stainless steel.
- F. Disc: Ductile iron with EPDM coating.
- G. Actuator: Worm gear or traveling nut.
- H. Body Design: Grooved-end or wafer style.

#### **2.04 IRON OS&Y GATE VALVES**

- A. UL 262 and FM 1120/1130 listed.
- B. Minimum Pressure Rating: 175 psig (1200 kPa).
- C. Body and Bonnet Material: Cast or ductile iron.
- D. Wedge: Cast or ductile iron, or bronze with elastomeric coating.
- E. Stem: Brass, bronze, or stainless steel.
- F. Packing: Non-asbestos PTFE.
- G. Supervisory Switch: External.

#### **2.05 TRIM AND DRAIN VALVES**

- A. Ball Valves:
  - 1. Description:
    - a. UL 258 or FM 1140 listed.
    - b. Pressure Rating: 175 psig (1200 kPa).
    - c. Body Design: Two piece.
    - d. Body Material: Forged brass or bronze.
    - e. Port Size: Full or standard.
    - f. Seat: PTFE.
    - g. Stem: Bronze or stainless steel.
    - h. Ball: Chrome-plated brass.
    - i. Actuator: Hand-lever.
    - j. End Connections: Threaded or grooved.
- B. Angle Valves:
  - 1. Description:
    - a. UL 258 or FM 1140 listed.
    - b. Pressure Rating: 175 psig (1200 kPa).
    - c. Body Material: Brass or bronze.
    - d. Ends: Threaded.
    - e. Stem: Bronze.
    - f. Disc: Bronze.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron, bronze, or aluminum.
- C. Globe Valves:
  - 1. Description:
    - a. UL 258 or FM 1140 listed.
    - b. Pressure Rating: 175 psig (1200 kPa).
    - c. Body Material: Bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded.
    - e. Stem: Bronze.
    - f. Disc Holder and Nut: Bronze.
    - g. Disc Seat: Nitrile.
    - h. Packing: Asbestos free.

- i. Handwheel: Malleable iron, bronze, or aluminum.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Confirm valve interior to be free of foreign matter and corrosion.
- B. Remove packing materials.
- C. Examine guides and seats by operating valves from the fully open position to the fully closed position.
- D. Examine valve threads and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage.
  - 1. Check bolting for proper size, length, and material.
  - 2. Verify gasket for size, defects, damage, and suitable material composition for service.
- F. Replace defective valves with new valves.

#### **3.02 INSTALLATION**

- A. Install valves in accessible locations to allow for operation, inspections, tests, and maintenance.
- B. Install listed valves in accordance with their listing.
- C. Install valves in accordance with manufacturer's instructions.
- D. Support valves independently of adjacent piping.
- E. Install valves in horizontal piping with stem at or above pipe center.
- F. Position valves to allow full actuator movement.
- G. Install OS&Y valves with full clearance for rising stem. Install surrounding components so they do not interfere with nor are they impacted by full extension of rising stem.
- H. Install supervised shutoff valves in supervised-open position.
- I. Install permanent identification signs indicating portion of system controlled by each shutoff valve.
- J. Install threaded-end valves with unions upstream and downstream.
- K. Install valve tags. See Section 210553. Label valves in accordance with NFPA standard applying to the piping system in which valves are installed.

**END OF SECTION 210523**

**SECTION 211300  
FIRE-SUPPRESSION SPRINKLER SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL (DIR) - Online Certifications Directory; Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
  - 1. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components, and accessories. Indicate system controls.
  - 2. Submit shop drawings to Authorities Having Jurisdiction for approval. Submit proof of approval to Architect.
- D. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements for additional provisions.
  - 2. Extra Sprinklers: Type and size matching those installed in quantity required by referenced NFPA design and installation standard.
  - 3. Sprinkler Wrenches: For each sprinkler type.
- F. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

**1.06 QUALITY ASSURANCE**

- A. Comply with FM (AG) requirements.
- B. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience and approved by manufacturer.
- E. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Sprinklers, Valves, and Equipment:
  - 1. Anvil International; \_\_\_\_\_: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Tyco Fire Protection Products; \_\_\_\_\_: [www.tyco-fire.com/#sle](http://www.tyco-fire.com/#sle).
  - 3. Viking Corporation; \_\_\_\_\_: [www.vikinggroupinc.com/#sle](http://www.vikinggroupinc.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.

### 2.02 SPRINKLER SYSTEM

- A. Sprinkler System: Provide coverage for entire building.
- B. Occupancy: Light hazard; comply with NFPA 13.
- C. Water Supply: Determine volume and pressure from water flow test data.
- D. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.

### 2.03 SPRINKLERS

- A. Suspended Ceiling Type: Concealed pendant type with matching push on escutcheon plate.
  - 1. Response Type: Quick.
  - 2. Coverage Type: Standard.
  - 3. Finish: Chrome plated.
  - 4. Escutcheon Plate Finish: Chrome plated.
  - 5. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- B. Exposed Area Type: Upright type with guard.
  - 1. Response Type: Quick.
  - 2. Coverage Type: Standard.
  - 3. Finish: Chrome plated.
  - 4. Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- C. Sidewall Type: Semi-recessed horizontal sidewall type with matching push on escutcheon plate.
  - 1. Response Type: Quick.
  - 2. Coverage Type: Standard.
  - 3. Finish: Chrome plated.
  - 4. Escutcheon Plate Finish: Chrome plated.
  - 5. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- D. Storage Sprinklers: Pendant type with guard.
  - 1. Response Type: Standard.
  - 2. Coverage Type: Standard.
  - 3. Finish: Chrome plated.
  - 4. Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- E. Flexible Drop System: Stainless steel, multiple use, open gate type.
  - 1. Application: Use to properly locate sprinkler heads.
  - 2. Include all supports and bracing.
  - 3. Provide braided type tube as required for the application.
  - 4. Manufacturers:
    - a. FlexHead Industries, a brand of Anvil International; \_\_\_\_\_: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
    - b. Victaulic Company; Vic-Flex: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).



**2.04 PIPING SPECIALTIES**

- A. Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber-faced clapper to automatically actuate water motor alarm, pressure retard chamber and variable pressure trim with the following additional capabilities and features:
  - 1. Activate electric alarm.
  - 2. Test and drain valve.
  - 3. Replaceable internal components without removing valve from installed position.
- B. Backflow Preventer: Reduced pressure principle valve assembly backflow preventer with drain and OS & Y gate valve on each end.

**END OF SECTION 211300**

**SECTION 220517**  
**SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe sleeves.
- B. Pipe sleeve-seals.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.

**1.03 REFERENCE STANDARDS**

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2022a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

**PART 2 PRODUCTS**

**2.01 PIPE SLEEVES**

- A. Vertical Piping:
  - 1. Sleeve Length: 1 inch (25 mm) above finished floor.
  - 2. Provide sealant for watertight joint.
- 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. 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 078400 to prevent the spread of fire, smoke, and gases.

**2.02 PIPE-SLEEVE SEALS**

- A. Modular Mechanical Sleeve-Seal:
  - 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 with service requirements.
  - 4. Service Requirements:
    - a. Corrosion resistant.
    - b. Underground, buried, and wet conditions.
    - c. Fire Resistant: 1 hour, UL (DIR) approved.
  - 5. Glass-reinforced plastic pressure end plates.
- B. Sealing Compounds:
  - 1. Provide packing and sealing compound to fill pipe to sleeve thickness.
  - 2. Combined packing and sealing compounding to match partition fire-resistance hourly rating.
- C. Pipe Sleeve Material:
  - 1. Bearing Walls: Steel, cast iron, or terra-cotta pipe.
  - 2. Masonry Structures: Sheet metal or fiber.

- D. Wall Sleeve: PVC material with waterstop collar, and nailer end-caps.

### **PART 3 EXECUTION**

#### **3.01 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.
1. Underground Piping: Caulk pipe sleeve watertight with mechanically expandable chloroprene inserts with bitumen sealed metal components.
  2. Aboveground Piping:
    - a. Pack solid using mineral fiber complying with ASTM C592.
    - b. Fill space with an elastomer caulk to a depth of 0.50 inch (15 mm) where penetrations occur between conditioned and unconditioned spaces.
  3. All Rated Openings: Caulk tight with fire stopping material complying with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.
  4. Caulk exterior wall sleeves watertight with mechanically expandable chloroprene inserts with mastic-sealed components.
- 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 220517**

**SECTION 220519  
METERS AND GAUGES FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
- D. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2012, with Addendum (2018).

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Utility Service Metering: Coordinate and apply Utility Service Provider requirements in terms of meter type, size, physical location, pipe size, upstream/downstream pipe lengths required, and other installation details.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

**PART 2 PRODUCTS**

**2.01 PRESSURE GAUGES**

- A. Bourdon Tube for Liquids and Gases:
  - 1. Accuracy: ASME B40.100, adjustable commercial grade (D) with 5 percent of span.
  - 2. Process Connection: Lower-back, 1/4 inch (8 mm, DN) NPT male except where noted.

**2.02 THERMOMETERS**

- A. General:
  - 1. Product Compliance: ASTM E1.
  - 2. Lens: Clear glass, except where stated.
  - 3. Accuracy: One percent, when tested in accordance with ASTM E77, except where stated.
  - 4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.
- B. Thermometers - Adjustable Angle: 7 inch (177.8 mm) v-shape aluminum case with clear glass window scale, 6 inch (152.4 mm) NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.

**2.03 PRESSURE-TEMPERATURE TEST PLUGS:**

- A. Size: 500 psi (34.5 bar) capacity; 1/2 inch (13 mm) MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch (3 mm) pressure gauge or temperature probe.
- B. Wetted Materials per Temperature Range:
  - 1. Up to 200 degrees F (93 degrees C): Brass probe with neoprene core.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install metering products in accordance with manufacturer's instructions for intended fluid type and service.
- B. Install water meters with inlet and outlet isolation valves in compliance with AWWA M6.
- C. Install pressure gauges as follows:
  - 1. At Pumps: Place single gauge before strainer, suction side and discharge side.
  - 2. Include gauge cock to isolate each gauge and extend nipples for insulation clearance.

- D. Install thermometers as follows:
1. Water Heaters: Place upstream and downstream of heater.

**END OF SECTION 220519**

**SECTION 220523  
GENERAL-DUTY VALVES FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ball valves.
- B. Check valves.
- C. Thermostatic Balancing Valves.

**1.02 RELATED REQUIREMENTS**

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Non-rising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.

**1.04 REFERENCE STANDARDS**

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- C. ASME B31.9 - Building Services Piping; 2020.
- D. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017.
- E. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves; 2019.
- F. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .
- G. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- H. NSF 372 - Drinking Water System Components - Lead Content; 2022.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer:
  - 1. Obtain valves for each valve type from single manufacturer.
  - 2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Use the following precautions during storage:
  - 1. Maintain valve end protection and protect flanges and specialties from dirt.
    - a. Provide temporary inlet and outlet caps.

- b. Maintain caps in place until installation.
2. Store valves in shipping containers and maintain in place until installation.
  - a. Store valves indoors in dry environment.
  - b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

## **PART 2 PRODUCTS**

### **2.01 APPLICATIONS**

- A. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- B. Provide the following valves for the applications if not indicated on drawings:
  1. Shutoff: Ball, butterfly, \_\_\_\_\_.
  2. Throttling: Provide ball.
  3. Swing Check (Pump Outlet):
    - a. 2 inch (50 mm, DN) and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
- C. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.
- D. Domestic, Hot and Cold Water Valves:
  1. 2 inch (50 mm, DN) and Smaller:
    - a. Bronze and Brass: Provide with solder-joint ends.
    - b. Ball: One piece, full port, brass with brass trim.
    - c. Bronze Swing Check: Class 125, bronze disc.
    - d. Bronze Globe: Class 125, bronze disc.

### **2.02 GENERAL REQUIREMENTS**

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
  1. Handwheel: Valves other than quarter-turn types.
  2. Hand Lever: Quarter-turn valves 6 inch (150 mm, DN) and smaller except plug valves.
- D. Insulated Piping Valves: With 2 inch (50 mm, DN) stem extensions and the following features:
  1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- E. Valve-End Connections:
  1. Threaded End Valves: ASME B1.20.1.
  2. Solder Joint Connections: ASME B16.18.
- F. General ASME Compliance:
  1. Solder-joint Connections: ASME B16.18.
  2. Building Services Piping Valves: ASME B31.9.
- G. Potable Water Use:
  1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
  2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.

### **2.03 BRASS, BALL VALVES**

- A. One Piece, Full Port with Brass Trim and Threaded or Soldered Connections:
  1. Comply with MSS SP-110.
  2. CWP Rating: 200 psi (1379 kPa).
  3. Body: Forged brass.

4. Seats: PTFE.
5. Stem: Brass.
6. Ball: Chrome-plated brass.
7. Operator: Handle.

#### **2.04 BRONZE, BALL VALVES**

- A. General:
  1. Fabricate from dezincification resistant material.
  2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Full Port with Bronze Trim:
  1. Comply with MSS SP-110.
  2. WSP Rating: 150 psi (1035 kPa).
  3. WOG Rating: 600 psi (4140 kPa).
  4. Body: Forged bronze or dezincified-brass alloy.
  5. Ends Connections: Pipe thread or solder.
  6. Seats: PTFE.
  7. Stem: Bronze, blowout proof.
  8. Ball: Chrome plated brass.
  9. Operator: Provide lockable handle and stem extension.

#### **2.05 BRASS, INLINE CHECK VALVES**

- A. Class 150:
  1. Maximum Service Temperature: 250 degrees F (121.1 degrees C).
  2. Body: Forged brass.
  3. Disc: Forged brass.
  4. Seal: PTFE, bubble-tight.
  5. End Connections: Press.

#### **2.06 BRONZE, SWING CHECK VALVES**

- A. General:
  1. Fabricate from dezincification resistant material.
  2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Class 125:
  1. Pressure and Temperature Rating: MSS SP-80, Type 3.
  2. Design: Y-pattern, horizontal or vertical flow.
  3. WOG Rating: 200 psi (1380 kPa).
  4. Body: Bronze, ASTM B62.
  5. End Connections: Threaded.
  6. Disc: Bronze.

#### **2.07 THERMOSTATIC BALANCE VALVES**

- A. Thermostatic Balance Valve
  1. The valve shall be certified lead free according to NSF/ANSI 61 standards.
  2. The valve body shall be constructed out of stainless steel.
  3. The valve shall be rated for 200 PSIG working pressure and 250°F max. temperature.
  4. The valve shall have a fixed, non-adjustable (tamper proof) temperature setpoint; temperature setpoints range from 80°F (27°C) to 170°F (77°C) in 5°F (2.8°C) increments.
  5. The valve shall have a temperature accuracy of ±3.0°F (±1.7°C).
  6. The valve shall have a wax thermostatic element.
  7. The valve shall come in 6 sizes: 1/2"; 3/4"; 1"; 1 1/4"; 1 1/2"; 2".
- B. Accessories
  1. Union body with shutoff valves.
- C. Manufacturers:



1. ThermOmegaTech Inc.; circuitsolver.com
  - a. Model: CSUA

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

#### **3.02 INSTALLATION**

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Install check valves where necessary to maintain direction of flow as follows:

**END OF SECTION 220523**

**SECTION 220529  
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 055000 - Metal Fabrications.

**1.02 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; 2023.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2023.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- 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 2022).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- 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; 2023.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- L. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- M. FM (AG) - FM Approval Guide; Current Edition.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- O. UL (DIR) - Online Certifications Directory; Current Edition.
- P. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**PART 2 PRODUCTS**

**2.01 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 055000.
  - 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.

## **2.02 STRUT SYSTEMS FOR PIPE OR EQUIPMENT SUPPORT**

- A. Strut Channels:
1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
  2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.
- B. Hanger Rods:
1. Threaded zinc-plated steel unless otherwise indicated.
- C. Channel Nuts:
1. Provide carbon steel channel nut with epoxy copper or zinc finish and long, regular, or short spring as indicated on drawings.

## **2.03 PIPE HANGERS**

- A. Band Hangers, Adjustable:
1. MSS SP-58 type 7 or 9, zinc-plated ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
- B. Swivel Ring Hangers, Adjustable:
1. MSS SP-58 type 10, epoxy-painted, zinc-colored.
  2. 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.
  3. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
- C. Clevis Hangers, Adjustable:
1. Copper Tube: MSS SP-58 type 1, epoxy-plated copper.
  2. Standard-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.

## **2.04 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).
- B. Strut Clamps:
1. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.
- C. Insulation Coupling:
1. Two bolt-type clamps designed for installation under insulation.
  2. Material: Carbon steel with epoxy copper or zinc finish.

## **2.05 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 Shields for Insulated Piping:
1. MSS SP-58 type 40, ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
  2. General Construction and Requirements:
    - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
    - b. Shields Material: UV-resistant polypropylene with glass fill.

- c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch (321 mm).
  - d. Service Temperature: Minus 40 to 178 degrees F (Minus 40 to 81 degrees C).
  - e. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- C. 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.
- D. 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).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 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. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION 220529**

**SECTION 220553**  
**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Pipe markers.
- D. Underground warning tape.

**1.02 RELATED REQUIREMENTS**

- A. Section 099123 - Interior Painting: Identification painting.

**1.03 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Schedules:
  - 1. Submit plumbing component identification schedule listing equipment, piping, and valves.
  - 2. Detail proposed component identification data in terms of of wording, symbols, letter size, and color coding to be applied to corresponding product.
  - 3. Valve Data Format: Include id-number, location, function, and model number.

**PART 2 PRODUCTS**

**2.01 PLUMBING COMPONENT IDENTIFICATION GUIDELINE**

- A. Nameplates:
  - 1. Heat exchangers, water heaters, and other heat transfer products.
  - 2. Pumps, tanks, filters, water treatment devices, and other plumbing equipment products.
- B. Tags:
  - 1. Piping: 3/4 inch (20 mm) diameter and smaller.
  - 2. Manual operated and automated control valves.
- C. Pipe Markers: 3/4 inch (20 mm) diameter and higher.

**2.02 NAMEPLATES**

- A. Manufacturers:
  - 1. Brimar Industries, Inc; \_\_\_\_\_: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 2. Seton Identification Products; \_\_\_\_\_: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. 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.
  - 4. Nameplate Height: 3/4 inch (19 mm).
  - 5. Nameplate Material:
    - a. Flexible: Vinyl with adhesive backing per ASTM D709.
    - b. Metal: Brass with center-side holes for screw fastening.

**2.03 TAGS**

- A. Flexible: Vinyl with engraved black letters on light contrasting background color with up to three lines of text. Minimum tag size 1-1/2 inch (40 mm) in diameter.
- B. Valve Tag Chart: Typewritten 12-point letter size list in anodized aluminum frame.

- C. Piping: 3/4 inch (20 mm) diameter and smaller. Include corrosion resistant chain. Identify service, flow direction, and pressure.

## 2.04 PIPE MARKERS

- A. Manufacturers:
  - 1. Brady Corporation; \_\_\_\_\_: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  - 2. Brimar Industries, Inc; \_\_\_\_\_: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Seton Identification Products; \_\_\_\_\_: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Comply with ASME A13.1.
- C. 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.
- D. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- E. 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.
- F. Identification Scheme, ASME A13.1:
  - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
    - a. 3/4 to 1-1/4 inches (19 to 32 mm): Use 8 inch (203 mm) field-length with 1/2 inch (13 mm) text height.
    - b. 1-1/2 to 2 inches (38 to 51 mm): Use 8 inch (203 mm) field-length with 3/4 inch (19 mm) text height.
    - c. 2-1/2 to 6 inches (64 to 152 mm): Use 12 inch (305 mm) field-length with 1-1/4 inch (32 mm) text height.
  - 2. Secondary: Color scheme per fluid service.
    - a. Fire Quenching Fluids: White text on red background.
    - b. Flammable and Oxidizing Fluids: Black text on yellow background.
    - c. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

## 2.05 UNDERGROUND WARNING TAPE

- A. Manufacturers:
  - 1. Brady Corporation; \_\_\_\_\_: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  - 2. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  - 3. Seton Identification Products; \_\_\_\_\_: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
  - 1. Exception: Use foil-backed detectable type tape where required by serving utility or where directed by Owner.
- C. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil, 0.004 inch (0.10 mm).
- D. Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil, 0.005 inch (0.12 mm), unless otherwise required for proper detection.
- E. Legend: Type of service, continuously repeated over full length of tape.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Degrease and clean surfaces to receive identification products.

### 3.02 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. Apply ASME A13.1 Pipe Marking Rules:
  - 1. Place pipe marker adjacent to changes in direction.
  - 2. Place pipe marker adjacent each valve port and flange end.
  - 3. Place pipe marker at both sides of floor and wall penetrations.
  - 4. Place pipe marker every 25 to 50 feet (7.6 to 15.2 m) interval of straight run.

**END OF SECTION 220553**



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**SECTION 220719  
PLUMBING PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flexible elastomeric cellular insulation.
- B. Glass fiber insulation.
- C. Jacketing and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

**1.03 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, with Editorial Revision (2023).
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.07 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**

**2.01 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.

## 2.02 GLASS FIBER INSULATION

- A. Manufacturers:
  - 1. CertainTeed Corporation; \_\_\_\_\_: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville Corporation; \_\_\_\_\_: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
  - 1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
  - 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. 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)).
- D. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.
- E. Vapor Barrier Lap Adhesive: Compatible with insulation.
- F. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

## 2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
  - 1. Aeroflex USA; AEROFLEX Self-Seal: [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).
  - 2. Armacell LLC; AP Armaflex: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  - 3. K-Flex USA LLC; Insul-Tube: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
  - 2. Maximum Service Temperature: 220 degrees F (104 degrees C).
  - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

## 2.04 JACKETING AND ACCESSORIES

- A. PVC Plastic Jacket:
  - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F (Minus 18 degrees C).
    - b. Maximum Service Temperature: 150 degrees F (66 degrees C).
    - c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/(Pa s m)), maximum, when tested in accordance with ASTM E96/E96M.
    - d. Thickness: 10 mil, 0.010 inch (0.25 mm).
    - e. Connections: Brush on welding adhesive.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### 3.02 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.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. 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.
- G. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- H. Inserts and Shields:
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.
- J. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers.

**END OF SECTION 220719**

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**SECTION 221005  
PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 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. Pipe flanges, unions, and couplings.
- F. Pipe hangers and supports.
- G. Pipe sleeve-seal systems.
- H. Ball valves.
- I. Pressure reducing valves.
- J. Pressure relief valves.
- K. Pressure-temperature valves.
- L. Strainers.

**1.02 RELATED REQUIREMENTS**

- A. Section 083100 - Access Doors and Panels.
- B. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.
- C. Section 220529 - Hangers and Supports for Plumbing Piping and Equipment.
- D. Section 220553 - Identification for Plumbing Piping and Equipment.

**1.03 REFERENCE STANDARDS**

- A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems; 2015 (Reaffirmed 2020).
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- D. ASME B31.9 - Building Services Piping; 2020.
- E. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2023.
- F. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- G. ASTM B32 - Standard Specification for Solder Metal; 2020.
- H. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- I. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- J. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- K. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.
- L. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.
- M. ASTM C1277 - Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.

- N. ASTM C1540 - Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.
- O. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
- P. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
- Q. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
- R. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2023.
- S. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- T. AWWA C606 - Grooved and Shouldered Joints; 2022.
- U. AWWA C651 - Disinfecting Water Mains; 2023.
- V. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
- W. 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; 2020.
- X. FM 1680 - Approval Standard for Couplings Used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems Above and Below Ground, Industrial/ Commercial and Residential; 1989.
- Y. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- Z. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .
- AA. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- BB. NSF 372 - Drinking Water System Components - Lead Content; 2022.
- CC. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with applicable codes.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### 1.07 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

## PART 2 PRODUCTS

### 2.01 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.

### 2.02 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. Cast Iron Pipe: CISPI 301, hubless.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

### 2.03 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 clamp-and-shield assemblies.

### 2.04 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.

### 2.05 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Pipe: 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. Joints: Grooved mechanical couplings.
  - 4. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.

### 2.06 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch (80 mm, DN) and Under:
  - 1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Sizes Over 1 inch (25 mm, DN):
  - 1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
  - 1. Dimensions and Testing: In accordance with AWWA C606.
  - 2. Housing Material: Provide ASTM A47/A47M malleable iron, ductile iron, or \_\_\_\_\_, galvanized.
  - 3. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F (minus 34 degrees C) to 230 degrees F (110 degrees C).
  - 4. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
  - 5. When pipe is field grooved, provide coupling manufacturer's grooving tools.
- D. No-Hub Couplings:
  - 1. Testing: In accordance with ASTM C1277 and CISPI 310.



2. Gasket Material: Neoprene complying with ASTM C564.
  3. Band Material: Stainless steel.
  4. Eyelet Material: Stainless steel.
- E. Shielded, Heavy Duty No-Hub Couplings:
1. Testing: In accordance with ASTM C1540 and FM 1680.
  2. Gasket Material: Neoprene complying with ASTM C564.
  3. Band Material: Stainless steel.
  4. Eyelet Material: Stainless steel.
- F. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

## 2.07 PIPE HANGERS AND SUPPORTS

- A. See Section 220529 for additional requirements.
- B. 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.
- C. Plumbing Piping - Drain, Waste, and Vent:
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 Pipe Sizes 2 inch (50 mm, DN) and Over: Carbon steel, adjustable, clevis.
  3. Wall Support for Pipe Sizes to 3 inch (80 mm, DN): Cast iron hook.
  4. Wall Support for Pipe Sizes 4 inch (100 mm, DN) and Over: Welded steel bracket and wrought steel clamp.
  5. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- D. 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. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  4. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## 2.08 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.
- B. Wall Sleeve: PVC material with water-stop collar, and nailer end-caps.

## 2.09 BALL VALVES

- A. Manufacturers:
1. Anvil International; \_\_\_\_\_: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  2. Apollo Valves; \_\_\_\_\_: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  3. Grinnell Products; \_\_\_\_\_: [www.grinnell.com/#sle](http://www.grinnell.com/#sle).
  4. Nibco, Inc; \_\_\_\_\_: [www.nibco.com/#sle](http://www.nibco.com/#sle).

- B. Construction, 4 inch (100 mm, DN) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

## **2.10 PRESSURE REDUCING VALVES**

### **2.11 PRESSURE RELIEF VALVES**

- A. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

### **2.12 PRESSURE-TEMPERATURE VALVES**

- A. ANSI Z21.22, AGA certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F (98.9 degrees C), capacity ASME BPVC-IV certified and labelled.

### **2.13 STRAINERS**

- A. Size 1/2 inch (15 mm, DN) to 3 inch (80 mm, DN):
  - 1. Class 150, threaded forged bronze Y-pattern body, stainless steel perforated mesh screen with cap, and rated for 150 psi (1,034 kPa), 250 deg F (121.1 deg C) WOG service.
- B. Size 2 inch (50 mm, DN) and Smaller:
  - 1. Threaded brass body for 175 psi (1200 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.
  - 2. Class 150, threaded bronze body 300 psi (2070 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### **3.02 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.

### **3.03 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.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed.
  - 1. Coordinate size and location of access doors with Section 083100.
- I. Provide support for utility meters in accordance with requirements of utility companies.
- J. Install bell and spigot pipe with bell end upstream.
- K. Install valves with stems upright or horizontal, not inverted. See Section 220523.
- L. Install water piping to ASME B31.9.

- M. 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.
- N. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- O. Sleeve pipes passing through partitions, walls, and floors.
- P. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping as indicated.
  - 3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 7. Provide copper plated hangers and supports for copper piping.
  - 8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
  - 9. Support cast iron drainage piping at every joint.
- Q. 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.
- R. 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.

### **3.04 APPLICATION**

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Provide spring-loaded check valves on discharge of water pumps.
- D. Provide flow controls in water recirculating systems where indicated.

### **3.05 TOLERANCES**

- A. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

### **3.06 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. Test Results: Document and certify successful results, otherwise repair, document, and retest.

### **3.07 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.

### **3.08 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 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.

### **3.09 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).
  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 221005**

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**SECTION 221006  
PLUMBING PIPING SPECIALTIES**

**PART 2 PRODUCTS**

**1.01 GENERAL REQUIREMENTS**

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

**END OF SECTION 221006**

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**SECTION 223000  
PLUMBING EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Residential electric water heaters.
- B. Diaphragm-type compression tanks.
- C. In-line circulator pumps.

**1.02 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. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.
- C. UL 174 - Standard for Household Electric Storage Tank Water Heaters; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data:
  - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
  - 2. Provide electrical characteristics and connection requirements.
- 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.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements for additional provisions.

**1.04 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. Electric Water Heaters: UL listed and labeled to UL 174.
  - 3. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

**1.06 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty for \_\_\_\_\_. Complete forms in Owner's name and register with manufacturer.



## **PART 2 PRODUCTS**

### **2.01 WATER HEATERS**

- A. Manufacturers:
  - 1. A.O. Smith Water Products Co; \_\_\_\_\_: [www.hotwater.com/#sle](http://www.hotwater.com/#sle).
  - 2. Bradford White Corporation; \_\_\_\_\_: [www.bradfordwhite.com/#sle](http://www.bradfordwhite.com/#sle).
  - 3. Rheem Manufacturing Company; \_\_\_\_\_: [www.rheem.com/#sle](http://www.rheem.com/#sle).
  - 4. Lochinvar, LLC; [www.lochinvar.com](http://www.lochinvar.com).
- B. Residential Electric Water Heaters:
  - 1. Type: Automatic, electric, vertical storage.
  - 2. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
  - 3. Tank: Glass lined welded steel, thermally insulated with one inch (25 mm) thick glass fiber; encased in corrosion-resistant steel jacket; baked-on enamel finish.
  - 4. Controls: Automatic water thermostat with externally adjustable temperature range from 120 to 170 degrees F (49 to 77 degrees C), flanged or screw-in nichrome elements, enclosed controls and electrical junction box and operating light. Wire double element units so elements do not operate simultaneously.
  - 5. Accessories:
    - a. Water Connections: Brass.
    - b. Dip Tube: Brass.
    - c. Drain valve.
    - d. Anode: Magnesium.
    - e. Temperature and Pressure Relief Valve: ASME labeled.

### **2.02 DIAPHRAGM-TYPE COMPRESSION TANKS**

- A. Manufacturers:
  - 1. Amtrol Inc; \_\_\_\_\_: [www.amtrol.com/#sle](http://www.amtrol.com/#sle).
  - 2. Bell & Gossett, a brand of Xylem, Inc; \_\_\_\_\_: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 3. Wessels Company; [www.westank.com](http://www.westank.com).
- B. Construction: Welded steel, tested, rated for working pressure of 125 psig (860 kPa), with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- C. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psig (80 kPa).

### **2.03 IN-LINE CIRCULATOR PUMPS**

- A. Manufacturers:
  - 1. Armstrong Fluid Technology; \_\_\_\_\_: [www.armstrongfluidtechnology.com/#sle](http://www.armstrongfluidtechnology.com/#sle).
  - 2. Bell & Gossett, a brand of Xylem, Inc; \_\_\_\_\_: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 3. Grundfos Americas Corporation; [www.grundfos.com](http://www.grundfos.com).
- B. Casing: Bronze, rated for 125 psig (860 kPa) working pressure, with stainless steel rotor assembly.
- C. Impeller: Bronze.
- D. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.
- E. Seal: Carbon rotating against a stationary ceramic seat.
- F. Drive: Flexible coupling.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions required for applicable certifications.

- B. Coordinate system, equipment, and piping work with applicable electrical, drain, and waste support interconnections as included or provided by other trades.
- C. Domestic Water Storage Tanks:
  - 1. Provide \_\_\_\_\_ support, independent of building structural framing members.
  - 2. Clean and flush prior to delivery to site. 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.

**END OF SECTION 223000**

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**SECTION 224000  
PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 221005 - Plumbing Piping.
- B. Section 221006 - Plumbing Piping Specialties.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008 (Reaffirmed 2013).
- C. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- D. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
- E. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).
- F. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2024.
- G. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2024.
- H. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.
- I. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures; 1994 (Reaffirmed 2009).
- J. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.
- K. ASSE 1014 - Performance Requirements for Backflow Prevention Devices for Hand-Held Showers; 2020.
- L. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations; 2017 (Reaffirmed 2021).
- M. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.
- N. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- P. FM (AG) - FM Approval Guide; Current Edition.
- Q. IAPMO PS 106 - Tileable Shower Receptors and Shower Kits; 2015, with Editorial Revision.
- R. IAPMO Z124 - Plastic Plumbing Fixtures; 2022, with Editorial Revision.
- S. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- T. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- U. NSF 372 - Drinking Water System Components - Lead Content; 2022.
- V. UL (DIR) - Online Certifications Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- 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.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.05 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.

**1.06 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

**PART 2 PRODUCTS**

**2.01 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.

**2.02 PLUMBING FIXTURES**

- A. Refer to Plumbing Fixture Specifications on sheet P6.01.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

**3.02 PREPARATION**

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

**3.03 INSTALLATION**

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Install components level and plumb.
- C. Install and secure fixtures in place with wall supports and bolts.

**3.04 INTERFACE WITH WORK OF OTHER SECTIONS**

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

**3.05 ADJUSTING**

**3.06 CLEANING**

- A. Clean plumbing fixtures and equipment.

**3.07 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 224000**

**SECTION 230513  
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General construction and requirements.
- B. Applications.
- C. Single phase electric motors.
- D. Three phase electric motors.
- E. Electronically Commutated Motors (ECM).

**1.02 RELATED REQUIREMENTS**

- A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- B. Section 262913 - Enclosed Controllers.

**1.03 REFERENCE STANDARDS**

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015 (Reaffirmed 2020).
- B. NEMA MG 1 - Motors and Generators; 2021.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.
- C. Test Reports: Indicate test results verifying nominal efficiency and power factor for three phase motors larger than 1/2 horsepower.
- D. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
- E. Operation Data: Include instructions for safe operating procedures.
- F. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacture of electric motors and their accessories, with minimum three years documented product development, testing, and manufacturing experience.
- B. Comply with NFPA 70.
- C. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of high efficiency motors.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

**1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

## **PART 2 PRODUCTS**

### **2.01 GENERAL CONSTRUCTION AND REQUIREMENTS**

- A. Construction:
  - 1. Open drip-proof type except where specifically noted otherwise.
  - 2. Design for continuous operation in 104 deg. F. environment.
  - 3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
- B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- C. Wiring Terminations:
  - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
  - 2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

### **2.02 APPLICATIONS**

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

**END OF SECTION 230513**

**SECTION 230517**  
**SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe sleeves.
- B. Pipe-sleeve seals.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 230523 - General-Duty Valves for HVAC Piping.
- C. Section 230553 - Identification for HVAC Piping and Equipment: Piping identification.
- D. Section 230719 - HVAC Piping Insulation.

**1.03 REFERENCE STANDARDS**

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2022a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- C. FM (AG) - FM Approval Guide; Current Edition.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified this section.
  - 1. Minimum three years experience.
  - 2. Approved by manufacturer.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

**1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 PIPE SLEEVES**

- A. Manufacturers:
  - 1. Flexicraft Industries; Pipe Wall Sleeve: [www.flexicraft.com/#sle](http://www.flexicraft.com/#sle).
  - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Vertical Piping:
  - 1. Sleeve Length: 1 inch (25 mm) above finished floor.
  - 2. Provide sealant for watertight joint.
- C. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- 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 in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

## **2.02 PIPE-SLEEVE SEALS**

- A. Manufacturers:
  1. Advance Products & Systems, LLC; Innerlynx: [www.apsonline.com/#sle](http://www.apsonline.com/#sle).
  2. American Polywater Corporation; PGKD Modular Seals: [www.polywater-haufftechnik.com/#sle](http://www.polywater-haufftechnik.com/#sle).
  3. Flexicraft Industries; PipeSeal: [www.flexicraft.com/#sle](http://www.flexicraft.com/#sle).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Modular Mechanical Sleeve-Seal:
  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 with service requirements.
  4. Glass-reinforced plastic pressure end plates.
- C. Sealing Compounds:
  1. Provide packing and sealing compound to fill pipe to sleeve thickness.
  2. Combined packing and seal compound is to match partition fire-resistance hourly rating.
- D. Pipe Sleeve Material:
  1. Bearing Walls: Steel, cast iron, or terra-cotta pipe.
  2. Masonry Structures: Sheet metal or fiber.
- E. Wall Sleeve: PVC material with waterstop collar, and nailer end-caps.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

### **3.02 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. Inserts:
- E. Structural Considerations:
  1. Do not penetrate building structural members unless indicated.
- F. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
  1. Aboveground Piping:
    - a. Pack solid using mineral fiber in compliance with ASTM C592.
    - b. Fill space with an elastomer caulk to a depth of 0.50 inch (15 mm) where penetrations occur between conditioned and unconditioned spaces.
- G. 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.
- H. 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 230517**

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**SECTION 230529  
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment components.
- B. Retrofit piping cover system.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 055000 - Metal Fabrications: Materials and requirements for fabricated metal supports.
- C. Section 230548 - Vibration and Seismic Controls for HVAC.

**1.03 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; 2023.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2023.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- 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 2022).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- L. FM (AG) - FM Approval Guide; Current Edition.
- M. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- N. UL (DIR) - Online Certifications Directory; Current Edition.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.04 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 033000.

#### **1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
- D. Installer's Qualifications: Include evidence of compliance with specified requirements.
- E. 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.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
  2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
  3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
  5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Prefabricated Trapeze-Framed Metal Strut Systems:
  1. Manufacturers:
    - a. ABB Installation Products: [electrification.us.abb.com/#sle](http://electrification.us.abb.com/#sle).
    - b. B-Line, a brand of Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.
    - d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

2. Strut Channel or Bracket Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
  3. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch (2.66 mm).
  4. Minimum Channel Dimensions: 1-5/8 inch (41 mm) width by 13/16 inch (21 mm) height.
  5. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.
- C. Strut Channels:
1. Manufacturers:
    - a. B-Line, a brand of Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - b. Gripple, Inc; Universal Bracket: [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - c. Unistrut, a brand of Atkore International Inc: [www.unistrut.com/#sle](http://www.unistrut.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
    - e. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  2. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
  3. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.
- D. Hanger Rods:
1. Threaded zinc-plated steel unless otherwise indicated.
  2. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch (13 mm) diameter.
    - b. Piping up to 1 inch (25 mm, DN): 1/4 inch (6 mm) diameter.
    - c. Piping larger than 1 inch (25 mm, DN): 3/8 inch (10 mm) diameter.
    - d. Trapeze Support for Multiple Pipes: 3/8 inch (10 mm) diameter.
- E. Thermal Insulated Pipe Supports:
1. Manufacturers:
    - a. Buckaroos, Inc: [www.buckaroos.com/#sle](http://www.buckaroos.com/#sle).
  2. 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. Pipe supports to be provided for nominally sized, 1/2 to 30 inch (15 to 750 mm, DN) iron pipes.
    - d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by a 360 degree, PVC jacketing.
  3. PVC Jacket:
    - a. Pipe insulation protection shields to be provided.
    - b. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
    - c. Thickness: 60 mil (1.524 mm).
  4. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.
  5. Products:
    - a. Buckaroos, Inc: [www.buckaroos.com/#sle](http://www.buckaroos.com/#sle).
- F. 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.

- b. Support From Below: MSS SP-58 Types 35 through 38.
- 3. Operating Temperatures from 122 to 446 degrees F (50 to 230 degrees C):
  - a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.
- G. Pipe Stanchions:
  - 1. Manufacturers:
    - a. Anvil International; H-Block: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
    - c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
  - 3. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
  - 4. For pipe runs, use stanchions of same type and material where vertical adjustment is required for stationary pipe.
- H. Beam Clamps:
  - 1. Manufacturers:
    - a. FNW; 7201: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
    - c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
  - 3. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
  - 4. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
  - 5. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
  - 6. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
  - 7. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
  - 8. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
  - 9. 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.
- I. Riser Clamps:
  - 1. Manufacturers:
    - a. FNW; 7020: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
  - 3. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
  - 4. Medium Split Horizontal Pipe Clamp: MSS SP-58 type 4, carbon steel or stainless steel with epoxy plated, plain, stainless steel, or zinc plated finish.
  - 5. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
  - 6. UL (DIR) listed: Pipe sizes 1/2 to 8 inch (15 to 200 mm, DN).
- J. U-Bolts:
  - 1. Manufacturers:
    - a. FNW; 7610: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.

- c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.
- K. Strut Clamps:
  - 1. Manufacturers:
    - a. FNW; 7815: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Gripple Inc; GCS: [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.
    - d. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.
  - 3. Service Temperature Range: Minus 65 to 275 degrees F (Minus 53.8 to 135 degrees C).
- L. Insulation Clamps:
  - 1. Manufacturers:
    - a. FNW; 7897: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
    - c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  - 2. Two bolt-type clamps designed for installation under insulation.
  - 3. Material: Carbon steel with epoxy copper or zinc finish.
- M. Pipe Hangers:
  - 1. Split Ring Hangers:
    - a. Manufacturers:
      - 1) FNW; 7001: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
    - c. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
    - d. Provide hanger rod and nuts of the same type and material for a given pipe run.
    - e. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
  - 2. Swivel Ring Hangers, Adjustable:
    - a. Manufacturers:
      - 1) FNW; 7010: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. MSS SP-58 Type 10, epoxy-painted, zinc-colored.
    - c. 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.
    - d. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
  - 3. Clevis Hangers, Adjustable:
    - a. Manufacturers:
      - 1) FNW; 7005: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
    - c. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
    - d. Standard-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
    - e. UL (DIR) listed: Pipe sizes 2-1/2 to 8 inch (65 to 200 mm, DN).
- N. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
  - 1. Manufacturers:
    - a. Anvil International; H-Block: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
  - 2. Provide steel pedestals with thermoplastic or rubber base 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.



3. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
  5. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.
- O. Pipe Shields for Insulated Piping:
1. General Construction and Requirements:
    - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
    - b. Shields Material: UV-resistant polypropylene with glass fill.
    - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch (321 mm).
    - d. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
    - e. Maximum Service Temperature: 178 degrees F (81 degrees C).
    - f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- P. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

## **2.02 RETROFIT PIPING COVER SYSTEM**

- A. Manufacturers:
1. DecoShield Systems, Inc: [www.decoshield.com/#sle](http://www.decoshield.com/#sle).
- B. General Requirements:
1. Surface Burning Characteristics: Flame spread index/smoke developed index of 20/250, maximum, when tested in accordance with ASTM E84 or UL 723.
- C. Materials:
1. Piping Cover System: Removal-resistant, modular, snap-fit cover units, clips, and anchors for use with CPVC, steel, and copper piping systems.
  2. Cover Units: L-shaped and U-shaped cross-section units of flame retardant resin material, paintable finish.
  3. Unit Length: 7.5 feet (2.29 m).
  4. Provide coupling fittings for joining units end to end and prefabricated inside and outside corner fittings and end caps as required.
  5. Provide mounting clips to secure covers to wall-ceiling per manufacturer requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 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. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

**END OF SECTION 230529**

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**SECTION 230553**  
**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Adhesive-backed duct markers.
- D. Pipe markers.
- E. Ceiling tacks.

**1.02 RELATED REQUIREMENTS**

- A. Section 099123 - Interior Painting: Identification painting.

**1.03 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- F. Project Record Documents: Record actual locations of tagged valves.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION APPLICATIONS**

- A. Air Handling Units: Nameplates.
- B. Air Terminal Units: Tags.
- C. Automatic Controls: Tags. Key to control schematic.
- D. Control Panels: Nameplates.
- E. Dampers: Ceiling tacks, where located above lay-in ceiling.
- F. Ductwork: Nameplates.
- G. Piping: Tags.
- H. Pumps: Nameplates.
- I. Small-sized Equipment: Tags.
- J. Valves: Tags and ceiling tacks where located above lay-in ceiling.

**2.02 NAMEPLATES**

- A. Manufacturers:
  - 1. Advanced Graphic Engraving, LLC: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  - 5. Seton Identification Products, a Tricor Direct Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Letter Color: White.

- C. Letter Height: 1/4 inch (6 mm).
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

### 2.03 TAGS

- A. Manufacturers:
  - 1. Advanced Graphic Engraving: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  - 3. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 4. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 5. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  - 6. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
- C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.
- D. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

### 2.04 ADHESIVE-BACKED DUCT MARKERS

- A. Manufacturers:
  - 1. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 2. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 3. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
- B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch (0.76 mm); printed with UV and chemical resistant inks.
- C. Style: Individual Label.
- D. Color: Yellow/Black.

### 2.05 PIPE MARKERS

- A. Manufacturers:
  - 1. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  - 2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  - 5. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- 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. Color code as follows:
  - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.
  - 2. Toxic and Corrosive Fluids: Orange with black letters.

### 2.06 CEILING TACKS

- A. Manufacturers:
  - 1. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
- B. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
- C. Color code as follows:
  - 1. HVAC Equipment: Yellow.

2. Fire Dampers and Smoke Dampers: Red.
3. Heating/Cooling Valves: Blue.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

#### **3.02 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. Use tags on piping 3/4 inch (20 mm) diameter and smaller.
  1. Identify service, flow direction, and pressure.
  2. Install in clear view and align with axis of piping.
  3. 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.
- 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 230553**

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**SECTION 230593**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Measurement of final operating condition of HVAC systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 014000 - Quality Requirements: Employment of testing agency and payment for services.

**1.03 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, with Errata (2019).
- C. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems; 2019, with Errata (2022).
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2023.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract. The following are approved test and balance contractors. No others may be used or their work will be dismissed and test and balance will need to be done again. 1) HiTech Test and Balance Freeland. 2) Great Lakes Balancing, Grand Rapids. 3) Integrity Test and Balance, Traverse City, and 4) Ener-Tech Testing, Holly Michigan
- C. 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. Include at least the following in the plan:
    - a. 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.
    - b. 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.
    - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    - d. Final test report forms to be used.
    - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. 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. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations. Provide additional PDF of same.



5. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
6. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
7. Units of Measure: Report data in I-P (inch-pound) units only.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 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. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  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. See approved T and B contractors above.
  2. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabc.com/#sle](http://www.aabc.com/#sle); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org/#sle](http://www.nebb.org/#sle).
    - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: [www.tabbcertified.org/#sle](http://www.tabbcertified.org/#sle).
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

### **3.02 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. Hydronic systems are flushed, filled, and vented.
  13. Pumps are rotating correctly.
  14. Proper strainer baskets are clean and in place.
  15. 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.

### **3.03 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 additional balancing devices as required.

### **3.04 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.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

### **3.05 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.

### **3.06 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. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. 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.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. 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.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

- K. 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.
- L. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- M. On fan powered VAV boxes, adjust air flow switches for proper operation.

### **3.07 WATER SYSTEM PROCEDURE**

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

### **3.08 SCOPE**

- A. Test, adjust, and balance the following:
  - 1. Plumbing Pumps.
  - 2. HVAC Pumps.
  - 3. Water Tube Boilers.
  - 4. Air Cooled Refrigerant Condensers.
  - 5. Packaged Roof Top Heating/Cooling Units.
  - 6. Packaged Terminal Air Conditioning Units.
  - 7. Unit Air Conditioners.
  - 8. Air Coils.
  - 9. Air Handling Units.
  - 10. Fans.
  - 11. Air Filters.
  - 12. Air Terminal Units.
  - 13. Air Inlets and Outlets.

### **3.09 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. Starter size, rating, heater elements.
  - 8. 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.
  6. Center to center distance, maximum, minimum, and actual.
- C. Pumps:
1. Identification/number.
  2. Manufacturer.
  3. Size/model.
  4. Impeller.
  5. Service.
  6. Design flow rate, pressure drop, BHP.
  7. Actual flow rate, pressure drop, BHP.
  8. Discharge pressure.
  9. Suction pressure.
  10. Total operating head pressure.
  11. Shut off, discharge and suction pressures.
  12. Shut off, total head pressure.
- D. Combustion Equipment:
1. Boiler manufacturer.
  2. Model number.
  3. Serial number.
  4. Gas flow rate.
  5. Heat input.
  6. Burner manifold gas pressure.
  7. Heat output.
- E. 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.
- F. Heating Coils:
1. Identification/number.
  2. Location.
  3. Service.
  4. Manufacturer.
  5. Air flow, design and actual.
  6. Water flow, design and actual.
  7. Water pressure drop, design and actual.
  8. Entering water temperature, design and actual.
  9. Leaving water temperature, design and actual.
  10. Entering air temperature, design and actual.
  11. Leaving air temperature, design and actual.
  12. Air pressure drop, design and actual.
- G. 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.
- H. 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. Required mixed air temperature.
  11. Actual mixed air temperature.
  12. Design outside/return air ratio.
  13. Actual outside/return air ratio.
- I. Exhaust Fans:
1. Location.
  2. Manufacturer.
  3. Model number.
  4. Serial number.
  5. Air flow, specified and actual.
  6. Total static pressure (total external), specified and actual.
  7. Inlet pressure.
  8. Discharge pressure.
  9. Sheave Make/Size/Bore.
  10. Number of Belts/Make/Size.
  11. Fan RPM.
- J. Terminal Unit Data:
1. Manufacturer.
  2. Type, constant, variable, single, dual duct.
  3. Identification/number.
  4. Location.
  5. Model number.
  6. Size.
  7. Minimum static pressure.
  8. Minimum design air flow.
  9. Maximum design air flow.
  10. Maximum actual air flow.
  11. Inlet static pressure.
- K. Air Distribution Tests:
1. Air terminal number.

2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Design air flow.
6. Test (final) air flow.
7. Percent of design air flow.

**END OF SECTION 230593**

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**SECTION 230713  
DUCT INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct insulation.
- B. Duct liner.
- C. Weather barrier coatings.
- D. Jacketing and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 230553 - Identification for HVAC Piping and Equipment.

**1.03 REFERENCE STANDARDS**

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- E. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.
- F. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- G. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation; 2023.
- H. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts; 2016 (Reapproved 2021).
- I. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019 (Reapproved 2022).
- J. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers; 2015 (Reapproved 2022).
- K. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- L. ASTM C1775 - Standard Specification for Laminate Protective Jacket and Tape for Use Over Thermal Insulation for Outdoor Applications; 2022.
- M. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).
- N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- O. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- P. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- Q. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.



- R. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- S. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than 6 years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section.

#### **1.06 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.

#### **1.07 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**

#### **2.01 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.

#### **2.02 GLASS FIBER, FLEXIBLE**

- A. Manufacturer:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
  - 1. K (Ksi) value: 0.36 at 75 degrees F (0.052 at 24 degrees C), when tested in accordance with ASTM C518.
  - 2. Maximum Service Temperature: 1,200 degrees F (649 degrees C).
  - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. 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.
- D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
- E. Indoor Vapor Barrier Mastic:
  1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- F. Outdoor Vapor Barrier Mastic:
  1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

### **2.03 WEATHER BARRIER COATINGS**

- A. Weather-Resistive Barrier Coating: Fire-resistive, UV resistant, water-based mastic for use over closed cell polyethylene and polyurethane foam insulation; applied with glass fiber or synthetic reinforcing mesh.
  1. Manufacturers:
    - a. H.B. Fuller Construction Products, Inc; Childers - CP Series Weather Barrier Coating: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
  2. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.
  3. Water Vapor Permeance: Greater than 1.0 perm (57 ng/(Pa s m)) in accordance with ASTM E96/E96M.
  4. Resistance to Fungal Growth: No growth when tested in accordance with ASTM D5590.
  5. Color: As selected by Architect.

### **2.04 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: Smooth.
  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.
- B. Aluminum-Foil Laminate Jacket:
  1. Manufacturers:
    - a. Ideal Tape Co., Inc: [www.idealtape.com/#sle](http://www.idealtape.com/#sle).
  2. Factory-applied, pressure sensitive adhesive jacketing on paper release liner.
  3. Comply with ASTM C1775.
- C. Aluminum-Foil Laminate Jacket:
  1. Manufacturers:
    - a. H.B. Fuller Construction Products, Inc; Foster - Vapor-Fas: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
  2. Factory-applied, pressure sensitive adhesive jacketing to comply with ASTM C1775.
- D. Flexible Weather-Proofing Outdoor Jacket: Self-healing, field-applied outdoor cladding.
  1. Material: Aluminum foil/polymer laminate with rubberized asphalt layer and acrylic adhesive.
  2. Thickness: 34 mil, 0.034 inch (0.86 mm).
  3. Finish: Embossed.
  4. Color: Silver.
  5. Water Vapor Transmission: 0.002 perm inch (0.0029 ng/(Pa s m)), maximum, when tested in accordance with ASTM E96/E96M.
  6. Mold Resistance: Pass when tested in accordance with ASTM C1338.
  7. Emissivity: 0.30 when tested in accordance with ASTM C1371.
  8. Manufacturers:

- a. Polyguard Products; Alumaguard: [www.polyguardproducts.com.com/#sle](http://www.polyguardproducts.com.com/#sle).
- E. Reinforced Tape:
  - 1. Manufacturers:
    - a. Ideal Tape Co., Inc: [www.idealtape.com/#sle](http://www.idealtape.com/#sle).
  - 2. FSK tape suitable for sealing seams between insulation, insulated elbows, and fittings resulting in a tight, smooth surface without wrinkles.
  - 3. Comply with UL 723 or ASTM E84.
  - 4. Moisture Vapor Permeability: 0.00 perm inch (0.00 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
  - 5. Finish: Match insulation.

## 2.05 DUCT LINER

- A. Manufacturers:
  - 1. Aeroflex USA; AEROFLEX Breathe-EZ: [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).
  - 2. Armacell LLC; ArmaFlex Ultra with FlameDefense: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  - 3. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 4. Ductmate Industries, Inc, a DMI Company: [www.ductmate.com/#sle](http://www.ductmate.com/#sle).
  - 5. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 6. Owens Corning Corporation; QuietR Rotary Duct Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Note: Choose the liner type - Elastomeric Foam, Glass Fiber, or Phenolic Foam.
- C. 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.
  - 6. Connection: Waterproof vapor barrier adhesive.
- D. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. 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.
- C. Insulated Ducts Conveying Air Above Ambient Temperature:
  - 1. Provide with or without standard vapor barrier jacket.
  - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- D. Exterior Applications: Provide insulation with vapor barrier jacket.

- E. Slope exterior ductwork to shed water. See detail on drawings.
- F. 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.
- G. Duct and Plenum 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. Seal liner surface penetrations with adhesive.
  - 5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

### **3.03 SCHEDULES**

- A. Exhaust Ducts Within 10 ft (3 m) of Exterior Openings:
- B. Outside Air Intake Ducts:
- C. Plenums:
- D. Plenums (Cooling System):
- E. Supply Ducts:
- F. Supply Ducts From Fans to Vertical Ducts in Shafts (Cooling System):
- G. Supply Ducts in Vertical Shafts (Cooling Systems):
- H. Supply ducts After Terminal Boxes:
- I. Ducts Exposed to Outdoors:

**END OF SECTION 230713**

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**SECTION 230913  
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

**PART 2 PRODUCTS**

**1.01 EQUIPMENT - GENERAL**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**END OF SECTION 230913**

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**SECTION 230923  
DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC**

**PART 2 PRODUCTS**

**END OF SECTION 230923**



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**SECTION 231123  
FACILITY NATURAL-GAS PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves, and connections for natural gas piping systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 099113 - Exterior Painting.
- C. Section 099123 - Interior Painting.
- D. Section 230516 - Expansion Fittings and Loops for HVAC Piping.
- E. Section 230548 - Vibration and Seismic Controls for HVAC.
- F. Section 230553 - Identification for HVAC Piping and Equipment.
- G. Section 335216 - Gas Hydrocarbon Piping.

**1.03 REFERENCE STANDARDS**

- A. ANSI LC 1/CSA 6.26 - Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing; 2019.
- B. ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2019.
- C. ANSI Z21.80/CSA 6.22 - Line Pressure Regulators; 2019.
- D. ANSI Z223.1 - National Fuel Gas Code; 2024.
- E. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
- F. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- G. ASME B31.1 - Power Piping; 2022.
- H. ASME B31.9 - Building Services Piping; 2020.
- I. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- K. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023a.
- L. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
- M. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).
- N. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
- O. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
- P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- Q. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends; 2011.
- R. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Welders' Certificates: Submit certification of welders' compliance with ASME BPVC-IX.
- D. Project Record Documents: Record actual locations of valves.

#### **1.05 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, and ASTM specification.

#### **1.06 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.

### **PART 2 PRODUCTS**

#### **2.01 NATURAL GAS PIPING, ABOVE GRADE**

- A. Steel Pipe: ASTM A53/A53M, Grade B, Type F, 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.

#### **2.02 FLANGES, UNIONS, AND COUPLINGS**

- A. Unions for Pipe Sizes 3 Inches (80 mm) and Under:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
- B. Flanges for Pipe Size Over 1 Inch (25 mm):
  - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

#### **2.03 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. Rooftop Supports for Low-Slope Roofs: See specifications elsewhere for roof supports.
    - a. Bases: High dens
    - 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. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
- 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
  - 5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
  - 6. Other Types: As required.

#### **2.04 BALL VALVES**

- A. Manufacturers:
- 1. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  - 2. Effebi; Gladiator: [www.effebi.com/#sle](http://www.effebi.com/#sle).
  - 3. Grinnell Products: [www.grinnell.com/#sle](http://www.grinnell.com/#sle).
  - 4. Milwaukee Valve Company: [www.milwaukeevalve.com/#sle](http://www.milwaukeevalve.com/#sle).
  - 5. Nibco, Inc: [www.nibco.com/#sle](http://www.nibco.com/#sle).
- B. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, brass, bronze, or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blowout proof stem, lever handle with balancing stops, solder, threaded, or grooved ends with union.

#### **2.05 PLUG VALVES**

- A. Construction 2-1/2 Inches (65 mm) and Larger: MSS SP-78, 175 psi (1200 kPa) CWP, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

#### **2.06 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS**

- A. Manufacturers:
- 1. Maxitrol Company; \_\_\_\_\_: [www.maxitrol.com/#sle](http://www.maxitrol.com/#sle).
- B. Compliance Requirements:
- 1. Appliance Regulator: ANSI Z21.18/CSA 6.3.
  - 2. Line Pressure Regulator: ANSI Z21.80/CSA 6.22.
- C. Maximum Inlet Operating Pressure: 10 psi (68.9 kPa).
- D. Maximum Body Pressure: 10 psi (1000 mbar).
- E. Output Pressure Range: 1 inch wc (2.5 mbar) to 80 inch wc (200 mbar).

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that excavations are to required grade, dry, and not over-excavated.

#### **3.02 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.

#### **3.03 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. Refer to Section 230516.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed.
- I. Provide support for utility meters in accordance with requirements of utility companies.
- J. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
  - 1. Painting of interior piping systems and components is specified in Section 099123.
  - 2. Painting of exterior piping systems and components is specified in Section 099113.
- K. Install valves with stems upright or horizontal, not inverted.
- L. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood or provide ventless approved gas pressure reducing valves.
- M. Sleeve pipes passing through partitions, walls and floors.
- N. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping as indicated.
  - 3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 7. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 230548.

### **3.04 APPLICATION**

- A. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- C. Install ball valves for throttling, bypass, or manual flow control services.
- D. Provide plug valves in natural gas systems for shut-off service.

### **3.05 SERVICE CONNECTIONS**

- A. Provide new gas service complete with gas meter and regulators in accordance with Section 335216. Gas service distribution piping to have initial minimum pressure of 2 psi (14 kPa). Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

### **3.06 SCHEDULES**

- A. Pipe Hanger Spacing:
  - 1. Metal Piping:
    - a. Pipe Size: 1/2 inches (15 mm) to 1-1/4 inches (32 mm):
      - 1) Maximum Hanger Spacing: 6.5 ft (2 m).
      - 2) Hanger Rod Diameter: 3/8 inches (9 mm).
    - b. Pipe Size: 1-1/2 inches (40 mm) to 2 inches (50 mm):

- 1) Maximum Hanger Spacing: 10 ft (3 m).
- 2) Hanger Rod Diameter: 3/8 inch (9 mm).
- c. Pipe Size: 2-1/2 inches (65 mm) to 3 inches (75 mm):
  - 1) Maximum Hanger Spacing: 10 ft (3 m).
  - 2) Hanger Rod Diameter: 1/2 inch (13 mm).
- d. Pipe Size: 4 inches (100 mm) to 6 inches (150 mm):
  - 1) Maximum Hanger Spacing: 10 ft (3 m).
  - 2) Hanger Rod Diameter: 5/8 inch (15 mm).
- e. Pipe Size: 8 inches (200 mm) to 12 inches (300 mm):
  - 1) Maximum Hanger Spacing: 14 ft (4.25 m).
  - 2) Hanger Rod Diameter: 7/8 inch (22 mm).

**END OF SECTION 231123**

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**SECTION 233100  
HVAC DUCTS AND CASINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal ducts.
- B. Flexible ducts.
- C. Air plenums and casings.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 230130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.
- C. Section 230548 - Vibration and Seismic Controls for HVAC.
- D. Section 230713 - Duct Insulation: External insulation and duct liner.
- E. Section 233300 - Air Duct Accessories.
- F. Section 233319 - Duct Silencers.
- G. Section 233600 - Air Terminal Units.
- H. Section 233700 - Air Outlets and Inlets: Fabric air distribution devices.

**1.03 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; 2023.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- H. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.
- I. SMACNA (RIDC) - Rectangular Industrial Duct Construction Standards; 2007.
- J. SMACNA (ROUND) - Round Industrial Duct Construction Standards; 2013.
- K. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate per appropriate seal class, following SMACNA (LEAK).



### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 6 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 6 years of documented experience.

### 1.06 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.

### 1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

## PART 2 PRODUCTS

### 2.01 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.
- C. Acoustical Treatment: Provide sound-absorbing liners for metal-based ducts in compliance with Section 233319.
- D. 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 2 in-wc (500 Pa) of galvanized steel.
  - 3. Flat Oval: Plus 2 in-wc (500 Pa) of galvanized steel.
  - 4. Flexible Duct (Fabric and wire): Plus or minus 2 in-wc (500 Pa); see Section 233700.
- E. Duct Sealing and Leakage in accordance with Static Pressure Class:
  - 1. Low Pressure Service: Up to 2 in-wc (500 Pa):
    - a. Seal: Class C, apply to seal off transverse joints.
    - b. Leakage:
      - 1) Rectangular: Class 24 or 24 cfm/100 sq ft (680 Lpm/9.3 sq m).
      - 2) Round: Class 12 or 12 cfm/100 sq ft (340 Lpm/9.3 sq m).
- F. Duct Fabrication Requirements:
  - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
  - 2. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
  - 3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
  - 4. Construct tees, 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 airfoil turning vanes of perforated metal .
  - 5. Provide turning vanes of perforated metal when acoustical lining is indicated.
  - 6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
  - 7. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.

8. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide transition fitting, blank-out panels sealing louver area around duct are not allowed.

## 2.02 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. Flat-Oval Metal Ducts:
  1. Flat-Oval Single Wall Duct: Machine made from a round spiral lock seam duct.
    - a. Fittings: Manufacture at least two gauges heavier metal than the duct.
    - b. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
  2. Flat-Oval Double Wall Insulated Duct: Machine made from round spiral lock seam duct.
    - a. Fittings: Manufacture with solid inner wall.
    - b. Inner Wall: Perforated galvanized steel.
    - c. Insulation:
      - 1) Thickness: 1 inch (25 mm) fiberglass.
- D. 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 in accordance with SMACNA (DCS).
- E. Round Spiral Duct:
  1. Round spiral lock seam duct with galvanized steel outer wall.
  2. Manufacturers:
- F. Connectors, Fittings, Sealants, and Miscellaneous:
  1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
  2. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
    - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
    - b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

## 2.03 FLEXIBLE DUCTS

- A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
  1. Pressure Rating: 10 in-wc (2.50 kPa) positive and 5 in-wc (1.25 kPa) negative.
  2. Maximum Velocity: 5500 fpm (27.9 m/sec).
  3. Temperature Range: Minus 20 degrees F to 250 degrees F (Minus 28 degrees C to 121 degrees C).

## 2.04 AIR PLENUMS AND CASINGS

- A. Fabricate in accordance with SMACNA (DCS) for indicated operating pressures indicated.
- B. Minimum Fabrication Requirements:
  - 1. Fabricate acoustic plenum or casing with reinforcing turned inward.
  - 2. Provide 16-gauge, 0.059-inch (1.52 mm) sheet steel back facing and 22-gauge, 0.029-inch (0.76 mm) perforated sheet steel front facing with 3/32 inch (2.4 mm) diameter holes on 5/32 inch (4 mm) centers.
  - 3. Construct panels 3 inches (75 mm) thick, packed with 4.5 pcf (72 kg/cu m) minimum glass fiber insulation media, on inverted channel of 16-gauge, 0.059-inch (1.52 mm) sheet steel.
  - 4. Mount floor-mounted plenum or casings on 4-inch (100 mm) high concrete curbs. At floor, rivet panels on 8-inch (200 mm) centers to angles.
- C. Access Doors:
  - 1. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.
  - 2. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles.
  - 3. Provide clear wire glass observation ports, minimum 6 by 6 inch (150 by 150 mm) size.
- D. Fire-Rated Metal Panels:
  - 1. Fire Rating: 60 minutes when tested in accordance with ASTM E119.
  - 2. Material: Steel-faced composite panel with noncombustible structural high density mineral fiber core, UL or ETL labeled, nonload bearing fire separations.
    - a. Facing: Galvanized steel (G90), 24 gauge (0.0275 inch) (0.701 mm).
    - b. Finish: Unpainted.
    - c. Core: Mineral wool board.
    - d. Structural: Nonload bearing.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install products following the manufacturer's instructions.
- C. Comply with safety standards NFPA 90A and NFPA 90B.
- D. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- F. Flexible Ducts: Connect to metal ducts with adhesive.
- G. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- I. Connect terminal units to supply ducts directly or with one foot (300 mm) maximum length of flexible duct. Do not use flexible duct to change direction.
- J. 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.
- K. Set plenum doors at 6 to 12 inches (150 to 300 mm) above floor. Arrange door swings so that fan static pressure holds door in closed position.
- L. Fire Partitions: Provide firestopping sealing. See Section 078400.
- M. Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 233300, 233600, and 233700.

N. Duct Insulation: Provide duct insulation. See Section 230713.

**3.02 CLEANING**

- A. See Section 017419 - Construction Waste Management and Disposal for additional requirements.
- B. Clean thoroughly each duct system. See Section 230130.51.

**END OF SECTION 233100**

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**SECTION 233300**  
**AIR DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Combination fire and smoke dampers.
- E. Combination fire and smoke dampers - corridor dampers.
- F. Duct access doors.
- G. Duct test holes.
- H. Fire dampers.
- I. Flexible duct connectors.
- J. Smoke dampers.
- K. Volume control dampers.
- L. Low leakage (Class 1A) control dampers.
- M. Miscellaneous Products:
  - 1. Damper operators.
  - 2. Fire-rated enclosures.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 230548 - Vibration and Seismic Controls for HVAC.
- C. Section 233100 - HVAC Ducts and Casings.
- D. Section 233600 - Air Terminal Units: Pressure regulating damper assemblies.
- E. Section 253513 - Integrated Automation Actuators and Operators: Damper operators.
- F. Section 253516 - Integrated Automation Sensors and Transmitters: Damper position switch.
- G. Section 253523 - Integrated Automation Control Dampers: Product furnishing.

**1.03 REFERENCE STANDARDS**

- A. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- C. NFPA 92 - Standard for Smoke Control Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.
- E. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- F. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
- G. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.
- H. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- I. UL 555C - Standard for Safety Ceiling Dampers; Current Edition, Including All Revisions.
- J. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- D. Manufacturer's Installation Instructions: Provide instructions for fire dampers.
- E. Project Record Drawings: Record actual locations of access doors and test holes.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements for additional provisions.
  - 2. Extra Fusible Links: One of each type and size.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 6 years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

### PART 2 PRODUCTS

#### 2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers:
  - 1. Carlisle HVAC Products; Dynair Hollow Vane and Rail (Double Wall Vane): [www.carlislehvac.com/#sle](http://www.carlislehvac.com/#sle).
  - 2. Elgen Manufacturing Company, Inc: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
  - 3. Krueger-HVAC, Division of Air System Components: [www.krueger-hvac.com/#sle](http://www.krueger-hvac.com/#sle).
  - 4. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  - 5. Titus HVAC, a brand of Johnson Controls: [www.titus-hvac.com/#sle](http://www.titus-hvac.com/#sle).
  - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

#### 2.02 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:
  - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: [www.louvers-dampers.com/#sle](http://www.louvers-dampers.com/#sle).
  - 2. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  - 3. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  - 4. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- C. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch (150 mm) width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

#### 2.03 BACKDRAFT DAMPERS - FABRIC

- A. Fabric Backdraft Dampers: Factory-fabricated.
  - 1. Blades: Neoprene coated fabric material.
  - 2. Birdscreen: 1/2 inch (12 mm) nominal mesh of galvanized steel or aluminum.

3. Maximum Velocity: 1000 fpm (5 mps) face velocity.

#### **2.04 COMBINATION FIRE AND SMOKE DAMPERS**

- A. Manufacturers:
  1. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  2. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  3. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.
- C. Provide factory sleeve and collar for each damper.
- D. Multiple Blade Dampers: Fabricate with 16 gauge, 0.0598 inch (1.52 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 by 1/2 inch (3.2 by 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 1/2 inch (12.7 mm) actuator shaft.
- E. Operators: UL listed and labeled; spring-return, electric-type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior of duct and link to damper operating shaft.
- F. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.
- G. Electro Thermal Link: Fusible link melting at 165 degrees F (74 degrees C); 120 volts, single phase, 60 Hz; UL listed and labeled.

#### **2.05 COMBINATION FIRE AND SMOKE DAMPERS - CORRIDOR DAMPERS**

- A. Manufacturers:
  1. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  2. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  3. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.
- C. Provide factory sleeve and collar for each damper.
- D. Multiple Blade Dampers: Fabricate with 16 gauge, 0.0598 inch (1.52 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 by 1/2 inch (3.2 by 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 1/2 inch (12.7 mm) actuator shaft.
- E. Operators: UL listed and labeled; spring-return, electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior of duct and link to damper operating shaft.
- F. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.
- G. Electro Thermal Link: Fusible link melting at 165 degrees F (74 degrees C); 120 volts, single phase, 60 Hz; UL listed and labeled.

#### **2.06 DUCT ACCESS DOORS**

- A. Manufacturers:
  1. Ductmate Industries, Inc, a DMI Company: [www.ductmate.com/#sle](http://www.ductmate.com/#sle).
  2. Elgen Manufacturing Company, Inc: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
  3. Lloyd Industries, Inc: [www.firedamper.com/#sle](http://www.firedamper.com/#sle).



4. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
5. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
6. SEMCO LLC: [www.semcohvac.com/#sle](http://www.semcohvac.com/#sle).
7. Substitutions: See Section 016000 - Product Requirements.

B. Access doors with sheet metal screw fasteners are not acceptable.

## 2.07 DUCT TEST HOLES

- A. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.
1. Manufacturers:
    - a. Carlisle HVAC Products; Dynair Test Port with Red Cap with O-Ring Seal: [www.carlislehvac.com/#sle](http://www.carlislehvac.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.

## 2.08 FIRE DAMPERS

- A. Manufacturers:
1. AireTechnologies, Inc, a DMI Company: [www.airetechnologies.com/#sle](http://www.airetechnologies.com/#sle).
  2. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  3. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  4. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  5. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.
- C. Ceiling (Radiation) Dampers: Galvanized steel, 22-gauge, 0.0299-inch (0.76 mm) frame and 16-gauge, 0.0598-inch (1.52 mm) flap, two layers of 0.125-inch (3.2 mm) thick ceramic fiber on top side and one layer on bottom side for round flaps, with locking clip.
1. Boot Fitting: Factory-provided el type (90 degree). Include field-provided collar.
  2. Box Fitting: Factory-provided 26 gauge, 0.0179 inch (0.45 mm) with field-provided collar.
  3. Rated for three hour service in compliance with UL 555C.
- D. Horizontal Dampers: Galvanized steel, 22-gauge, 0.0299-inch (0.76 mm) frame, stainless steel closure spring, and lightweight, heat-retardant, non-asbestos fabric blanket.
- E. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream except for 1-inch (250 Pa) pressure-class ducts up to 12 inches (300 mm) in height.
- F. Multiple Blade Dampers: 16-gauge, 0.0598-inch (1.52 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 by 1/2 inch (3.2 by 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.
- G. Fusible Links: UL 33, separate at 160 degrees F (71 degrees C) with adjustable link straps for combination fire/balancing dampers.

## 2.09 FLEXIBLE DUCT CONNECTORS

- A. Manufacturers:
1. Carlisle HVAC Products; Dynair Connector Plus G90 Steel Offset Seam Neoprene Fabric: [www.carlislehvac.com/#sle](http://www.carlislehvac.com/#sle).
  2. Ductmate Industries, Inc, a DMI Company: [www.ductmate.com/#sle](http://www.ductmate.com/#sle).
  3. Elgen Manufacturing Company, Inc: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Flexible Duct Connections: Fabric crimped into metal edging strip.

## 2.10 SMOKE DAMPERS

- A. Fabricate in accordance with NFPA 90A and UL 555S, and as indicated.

- B. Dampers: UL Class 1 airfoil blade type smoke damper, normally open automatically operated by pneumatic actuator.
- C. Electro Thermal Link: Fusible link melting at 165 degrees F (74 degrees C); 120 volts, single phase, 60 Hz; UL listed and labeled.

### **2.11 VOLUME CONTROL DAMPERS**

- A. Products for Automatic Controls: See Section 253523.
- B. Manufacturers:
  - 1. AireTechnologies, Inc, a DMI Company: [www.airetechnologies.com/#sle](http://www.airetechnologies.com/#sle).
  - 2. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  - 3. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  - 4. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.
- C. Splitter Dampers:

### **2.12 LOW LEAKAGE (CLASS 1A) CONTROL DAMPERS**

- A. Manufacturers:
  - 1. Ruskin Company; CD50: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  - 2. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Maximum Leakage Allowed: 3 cfm/sq ft at 1 in-wc (15.2 L/sec/sq m at 0.25 kPa).
- C. Frame:
  - 1. Material: 20-gauge galvanized steel.
  - 2. Free-area: Single cross section.
- D. Blade:
  - 1. Type: Single-blade rectangle shape.
  - 2. Operation: Opposed type.
  - 3. Maximum Individual Blade Height: 8 inches (203 mm).
  - 4. Material: 12-gauge galvanized steel.
- E. Other Requirements:
  - 1. Rust Inhibitor Coating: Moisture and salt water-resistant.
  - 2. Sleeve or Flange: Factory-mounted standard.
  - 3. Custom: Include bird screen.

### **2.13 MISCELLANEOUS PRODUCTS**

- A. Damper Operators: Provide electric operators; see Section 253513.
- B. Damper position switch; see Section 253516.
- C. Fire-Rated Enclosures:
  - 1. Provide as required to preserve fire resistance rating of building elements.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Verify that electric power is available and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 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 by 8 inch (200 by 200 mm) size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch (100 by 100 mm) size access door for balancing dampers only. Review locations prior to fabrication.
- D. Provide duct test holes where required for testing and balancing purposes.
- E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire-rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.
- G. Demonstrate re-setting of fire dampers to Owner's representative.
- H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- I. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- J. 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 two duct widths from duct take-off.
- K. Use splitter dampers where indicated.
- L. 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.

**END OF SECTION 233300**

**SECTION 233416  
CENTRIFUGAL HVAC FANS**

**PART 2 PRODUCTS**

**1.01 PERFORMANCE REQUIREMENTS**

**1.02 WHEEL AND INLET**

**1.03 BEARINGS AND DRIVES**

**END OF SECTION 233416**

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**SECTION 233423  
HVAC POWER VENTILATORS**

**PART 2 PRODUCTS**

**1.01 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. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**END OF SECTION 233423**

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**SECTION 233424  
CIRCULATION FANS**

**PART 2 PRODUCTS**

**1.01 GENERAL REQUIREMENTS**

- 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. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**END OF SECTION 233424**



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**SECTION 233439**  
**HIGH-VOLUME, LOW-SPEED PROPELLER FANS**

**PART 2 PRODUCTS**

**1.01 GENERAL REQUIREMENTS**

- A. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 507.
- B. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.02 HIGH-VOLUME, LOW-SPEED PROPELLER FANS**

- A. Shafts and Bearings:
  - 1. Fan Shaft:
    - a. Ground and polished steel with anti-corrosive coating.
    - b. First critical speed at least 25 percent over maximum cataloged operating speed.
  - 2. Bearings:
    - a. Permanently sealed or pillow block type.
    - b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
    - c. 100 percent factory tested.

**END OF SECTION 233439**

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**SECTION 233600  
AIR TERMINAL UNITS**

**PART 2 PRODUCTS**

**END OF SECTION 233600**

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**SECTION 233700  
AIR OUTLETS AND INLETS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rectangular ceiling diffusers.
- B. Round ceiling diffusers.
- C. Registers/grilles:
  - 1. Ceiling-mounted, exhaust and return register/grilles.
  - 2. Ceiling-mounted, supply register/grilles.
  - 3. Wall-mounted, supply register/grilles.
  - 4. Wall-mounted, exhaust and return register/grilles.
- D. Duct-mounted supply and return registers/louvers.
- E. Fabric air distribution devices.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.
- B. ASHRAE Std 130 - Laboratory Methods of Testing Air Terminal Units; 2016.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- F. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.
- I. UL 2518 - Standard for Safety Air Dispersion Systems; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. 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.

**1.04 QUALITY ASSURANCE**

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 6 years of documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Krueger-HVAC: [www.krueger-hvac.com/#sle](http://www.krueger-hvac.com/#sle).
- B. Metalaire, a brand of Metal Industries Inc: [www.metalaire.com/#sle](http://www.metalaire.com/#sle).
- C. Price Industries: [www.priceindustries.com/#sle](http://www.priceindustries.com/#sle).
- D. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
- E. Titus, a brand of Air Distribution Technologies; \_\_\_\_\_: [www.titus-hvac.com/#sle](http://www.titus-hvac.com/#sle).
- F. Tuttle and Bailey: [www.tuttleandbailey.com/#sle](http://www.tuttleandbailey.com/#sle).
- G. Substitutions: See Section 016000 - Product Requirements.

## **2.02 FABRIC AIR DISTRIBUTION DEVICES**

- A. General Requirements:
  - 1. Diffuser material to comply with ASTM E84, UL 723, UL 2518, NFPA 90A, and NFPA 90B.
  - 2. Air Dispersion Method:
  - 3. Hanger Supports:

## **PART 3 EXECUTION**

### **3.01 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, despite whether dampers are specified as part of diffuser, or grille and register assembly.
- F. Paint ductwork visible behind air outlets and inlets matte black, see Section 099123.

### **3.02 CLOSEOUT ACTIVITIES**

- A. Demonstrate operational system to Owner's representative.
- B. Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

### **3.03 PROTECTION**

- A. Protect installed products until completion of project.
- B. Replace, repair, or touch-up damaged products before Substantial Completion.

**END OF SECTION 233700**

**SECTION 237200**  
**AIR-TO-AIR ENERGY RECOVERY EQUIPMENT**

**PART 2 PRODUCTS**

**END OF SECTION 237200**



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**SECTION 237416**  
**PACKAGED ROOFTOP AIR-CONDITIONING UNITS**

**PART 2 PRODUCTS**

**1.01 CASING**

- A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver-operated flush, cam type fasteners. 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).

**1.02 FANS**

**1.03 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.

**1.04 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.

**1.05 AIR FILTERS:**

**1.06 ROOF CURBS**

**END OF SECTION 237416**

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**SECTION 238126.13**  
**SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS**

**PART 2 PRODUCTS**

**1.01 SYSTEM DESIGN**

- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
  - 1. 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.
- C. Electrical Characteristics:
  - 1. \_\_\_\_\_ kW.
  - 2. \_\_\_\_\_ volts, single phase, 60 Hz.
  - 3. \_\_\_\_\_ amperes maximum fuse size.
  - 4. Disconnect Switch: Factory mount disconnect switch on equipment under provisions of Section 260583.

**1.02 OUTDOOR UNITS**

- A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
  - 1. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL 207.
- B. 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.
- C. Operating Controls:
  - 1. Control by room thermostat to maintain room temperature setting.

**END OF SECTION 238126.13**



**SECTION 260505  
SELECTIVE DEMOLITION FOR ELECTRICAL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical demolition.

**PART 2 PRODUCTS**

**2.01 MATERIALS AND EQUIPMENT**

- A. Materials and equipment for patching and extending work: As specified in individual sections.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Demolition drawings are based on casual field observation.
- B. Beginning of demolition means installer accepts existing conditions.

**3.02 PREPARATION**

- A. Disconnect electrical circuits for site lighting, remove light poles and light fixtures. Maintain existing lighting circuits.

**3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK**

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
  - 1. PCB- and DEHP-containing lighting ballasts.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Repair adjacent construction and finishes damaged during demolition and extension work.
- D. Maintain access to existing electrical installations that remain active. Modify installation as appropriate.
- E. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

**END OF SECTION**



**SECTION 260519**  
**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Variable-frequency drive cable.
- D. Wiring connectors.
- E. Electrical tape.
- F. Heat shrink tubing.
- G. Oxide inhibiting compound.
- H. Wire pulling lubricant.
- I. Cable ties.
- J. Firestop sleeves.

**1.02 RELATED REQUIREMENTS**

- A. Section 260505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 284600 - Fire Detection and Alarm: Fire alarm system conductors and cables.

**1.03 REFERENCE STANDARDS**

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM B800 - Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes - Annealed and Intermediate Tempers; 2005 (Reapproved 2021).
- F. ASTM B801 - Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation; 2018 (Reapproved 2023).
- G. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- H. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- I. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- J. NECA 104 - Standard for Installing Aluminum Building Wire and Cable; 2012.
- K. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
- L. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- M. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.



- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. NFPA 79 - Electrical Standard for Industrial Machinery; 2021.
- P. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- Q. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- R. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.
- S. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- T. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- U. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- V. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- W. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.
- X. UL 2277 - Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
  - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 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.
- B. Wire Pulling Lubricant: Certification of compatibility with conductors/cables.
- C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.
- D. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

## **PART 2 PRODUCTS**

### **2.01 CONDUCTOR AND CABLE APPLICATIONS**

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
  - 1. Exceptions:
    - a. Use variable-frequency drive cable for connection between variable-frequency motor controllers and associated motors.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Metal-clad cable is permitted only as follows:
  - 1. Where not otherwise restricted, may be used:
    - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
      - 1) Maximum Length: 6 feet (1.8 m).
  - 2. In addition to other applicable restrictions, may not be used:
    - a. Where not approved for use by the authority having jurisdiction.
    - b. Where exposed to damage.
    - c. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

### **2.02 CONDUCTOR AND CABLE 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 WC 70.
- 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 for Grounding and Bonding: Also comply with Section 260526.
- H. Conductor Material:
  - 1. Provide copper conductors except where aluminum conductors are specifically indicated or permitted for substitution. Conductor sizes indicated are based on copper unless specifically indicated as aluminum. Conductors designated with the abbreviation "AL" indicate aluminum.
    - a. Where aluminum conductors are substituted for copper, comply with the following:
      - 1) Size aluminum conductors to provide, when compared to copper sizes indicated, equivalent or greater ampacity and equivalent or less voltage drop.
      - 2) Increase size of raceways, boxes, wiring gutters, enclosures, etc. as required to accommodate aluminum conductors.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
  - 3. Tinned Copper Conductors: Comply with ASTM B33.
  - 4. Aluminum Conductors (only where specifically indicated or permitted for substitution): AA-8000 series aluminum alloy conductors recognized by ASTM B800 and compact stranded in accordance with ASTM B801 unless otherwise indicated.
- I. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
3. Color Code:
  - a. 208Y/120 V, 3 Phase, 4 Wire System:
    - 1) Phase A: Black.
    - 2) Phase B: Red.
    - 3) Phase C: Blue.
    - 4) Neutral/Grounded: White.
  - b. Equipment Ground, All Systems: Green.
  - c. Travelers for 3-Way and 4-Way Switching: Pink.

### **2.03 SINGLE CONDUCTOR BUILDING WIRE**

- A. Manufacturers:
  1. Copper Building Wire:
    - a. Cerro Wire LLC: [www.cerrowire.com/#sle](http://www.cerrowire.com/#sle).
    - b. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).
    - c. General Cable Technologies Corporation: [www.generalcable.com/#sle](http://www.generalcable.com/#sle).
    - d. Service Wire Co: [www.servicewire.com/#sle](http://www.servicewire.com/#sle).
    - e. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
  2. Aluminum Building Wire (only where specifically indicated or permitted for substitution):
    - a. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).
    - b. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
    - c. Stabiloy, a brand of General Cable Technologies Corporation: [www.stabiloy.com/#sle](http://www.stabiloy.com/#sle).
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
  1. Feeders and Branch Circuits:
    - a. Size 10 AWG and Smaller: Solid.
    - b. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
  1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2
  2. Aluminum Building Wire (only where specifically indicated or permitted for substitution): Type XHHW-2.

### **2.04 METAL-CLAD CABLE**

- A. Manufacturers:
  1. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).
  2. Service Wire Co: [www.servicewire.com/#sle](http://www.servicewire.com/#sle).
  3. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
  1. Size 10 AWG and Smaller: Solid.
  2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Provide dedicated neutral conductor for each phase conductor.
- G. Grounding: Full-size integral equipment grounding conductor.
- H. Armor: Steel, interlocked tape.

- I. Provide PVC jacket applied over cable armor.

## **2.05 VARIABLE-FREQUENCY DRIVE CABLE**

- A. Manufacturers:
  - 1. Service Wire Co; ServiceDrive: [www.servicewire.com/#sle](http://www.servicewire.com/#sle).
- B. 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.
- C. Conductor Stranding: Stranded.
- D. Insulation Voltage Rating: 1000 V.
- E. Insulation: Use only thermoset insulation types; thermoplastic insulation types are not permitted.
- F. Grounding: Full-size integral equipment grounding conductor or symmetrical arrangement of multiple conductors of equivalent size.
- G. Provide metallic shielding.
- H. Jacket: PVC or Chlorinated Polyethylene (CPE).

## **2.06 WIRING CONNECTORS**

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
  - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
  - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  - 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
  - 5. Copper Conductors Size 8 AWG and Larger: Use compression connectors where connectors are required.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
    - c. NSI Industries LLC: [www.nsiindustries.com/#sle](http://www.nsiindustries.com/#sle).
- G. Mechanical Connectors: Provide bolted type or set-screw type.
  - 1. Manufacturers:
    - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - b. nVent ILSCO: [www.ilsco.com/#sle](http://www.ilsco.com/#sle).

- c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
  - 1. Manufacturers:
    - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - b. nVent ILSCO: [www.ilSCO.com/#sle](http://www.ilSCO.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
  - 1. Manufacturers:
    - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - b. IlSCO: [www.ilSCO.com/#sle](http://www.ilSCO.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).

## 2.07 ACCESSORIES

- A. Electrical Tape:
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Plymouth Rubber Europa: [www.plymouthrubber.com/#sle](http://www.plymouthrubber.com/#sle).
  - 2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
  - 3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
  - 4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.
  - 5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).
  - 6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - c. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
  - 1. Manufacturers:
    - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - b. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
    - c. IlSCO: [www.ilSCO.com/#sle](http://www.ilSCO.com/#sle).
- D. Wire Pulling Lubricant:
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. American Polywater Corporation: [www.polywater.com/#sle](http://www.polywater.com/#sle).
    - c. Ideal Industries, Inc: [www.idealindustries.com/#sle](http://www.idealindustries.com/#sle).
  - 2. Listed and labeled as complying with UL 267.
  - 3. Suitable for use with conductors/cables and associated insulation/jackets to be installed.

4. Suitable for use at installation temperature.
5. Products:
  - a. American Polywater Corporation; Polywater J Cable Pulling Lubricant: [www.polywater.com/#sle](http://www.polywater.com/#sle).
  - b. American Polywater Corporation; Polywater LZ Cable Pulling Lubricant: [www.polywater.com/#sle](http://www.polywater.com/#sle).
- E. Cable Ties: Material and tensile strength rating suitable for application.
  1. Manufacturers:
    - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for cables and roofing system to be installed; designed to accommodate existing penetrations where applicable.
  1. Products:
    - a. Menzies Metal Products; Electrical Roof Stack and Cap: [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).
    - b. Menzies Metal Products; Electrical Retro Box: [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).
- G. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.
  1. Products:
    - a. HoldRite, a brand of Reliance Worldwide Corporation; HydroFlame Pro Series/HydroFlame Custom Built: [www.holdrite.com/#sle](http://www.holdrite.com/#sle).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

### **3.03 INSTALLATION**

- A. Circuiting Requirements:
  1. Unless dimensioned, circuit routing indicated is diagrammatic.
  2. When circuit destination is indicated without specific routing, determine exact routing required.
  3. Arrange circuiting to minimize splices.
  4. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
  5. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is permitted where not otherwise prohibited, except for the following:
    - a. Branch circuits fed from ground fault circuit interrupter (GFCI) circuit breakers.
    - b. Branch circuits fed from feed-through protection of GFI receptacles.
    - c. Branch circuits with dimming controls.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).

- D. Install aluminum conductors in accordance with NECA 104.
- E. Install metal-clad cable (Type MC) in accordance with NECA 120.
- F. Installation in Raceway:
  - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  - 2. Pull all conductors and cables together into raceway at same time.
  - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
  - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- I. Terminate cables using suitable fittings.
  - 1. Metal-Clad Cable (Type MC):
    - a. Use listed fittings.
    - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- J. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.
- K. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- L. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- M. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- N. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
  - 5. Connections for Aluminum Conductors: Fill connectors with oxide inhibiting compound where not pre-filled by manufacturer.
  - 6. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 7. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- O. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

- a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
  - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
  - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
3. Wet Locations: Use heat shrink tubing.
- P. Insulate ends of spare conductors using vinyl insulating electrical tape.
- Q. Identify conductors and cables in accordance with Section 260553.
- R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
  1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

**END OF SECTION**





**SECTION 260526  
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 265600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

**1.03 REFERENCE STANDARDS**

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify exact locations of underground metal water service pipe entrances to building.
  - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 GROUNDING AND BONDING REQUIREMENTS**

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. 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.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- F. Grounding Electrode System:
  - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    - a. Provide continuous grounding electrode conductors without splice or joint.
    - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
  - 2. Metal Underground Water Pipe(s):
    - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.
    - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
    - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
  - 3. Concrete-Encased Electrode:
    - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet (6.0 m) of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
  - 4. Ground Rod Electrode(s):
    - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
    - b. Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.
    - c. Where location is not indicated, locate electrode(s) at least 5 feet (1.5 m) outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
  - 5. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
  - 6. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.

- a. Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.
- G. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
  2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- H. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
  7. Provide bonding for metal building frame.

## 2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
  2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
1. Use insulated copper conductors unless otherwise indicated.
    - a. Exceptions:
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  2. Unless otherwise indicated, use compression connectors for underground, concealed and other inaccessible connections.
  3. Unless otherwise indicated, use mechanical connectors or compression connectors for accessible connections.
    - a. Exceptions:
      - 1) Use exothermic welded connections for connections to metal building frame.
  4. Manufacturers - Mechanical and Compression Connectors:
    - a. allG Fabrication: [www.allgfab.com/#sle](http://www.allgfab.com/#sle).
    - b. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
    - c. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - d. nVent ERICO: [www.nvent.com/#sle](http://www.nvent.com/#sle).
    - e. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).

5. Manufacturers - Exothermic Welded Connections:
  - a. Burndy LLC: [www.burndy.com/#sle](http://www.burndy.com/#sle).
  - b. nVent ERICO; Cadweld: [www.nvent.com/#sle](http://www.nvent.com/#sle).
  - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: [www.thermoweld.com/#sle](http://www.thermoweld.com/#sle).
- D. Ground Bars:
  1. Description: Copper rectangular ground bars with mounting brackets and insulators.
  2. Size: As indicated.
  3. Holes for Connections: As indicated or as required for connections to be made.
  4. Manufacturers:
    - a. allG Fabrication: [www.allgfab.com/#sle](http://www.allgfab.com/#sle).
    - b. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - c. nVent ERICO: [www.nvent.com/#sle](http://www.nvent.com/#sle).
    - d. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: [www.thermoweld.com/#sle](http://www.thermoweld.com/#sle).
- E. Ground Rod Electrodes:
  1. Comply with NEMA GR 1.
  2. Material: Copper-bonded (copper-clad) steel.
  3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.
  4. Manufacturers:
    - a. allG Fabrication: [www.allgfab.com/#sle](http://www.allgfab.com/#sle).
    - b. Galvan Industries, Inc: [www.galvanelectrical.com/#sle](http://www.galvanelectrical.com/#sle).
    - c. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).
    - d. nVent ERICO: [www.nvent.com/#sle](http://www.nvent.com/#sle).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
- D. Make grounding and bonding connections using specified connectors.
  1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 260553.

**3.03 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA ATS except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.
- C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

**END OF SECTION**



**SECTION 260529  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

**1.02 RELATED REQUIREMENTS**

- A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- C. Section 265100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- D. Section 265600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.
- E. Section 270529 - Hangers and Supports for Communications Systems.

**1.03 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; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
  - 2. Coordinate work to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
  - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for nonpenetrating rooftop supports.

**1.06 QUALITY ASSURANCE**

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.



## PART 2 PRODUCTS

### 2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
  - 1. Comply with the following. Where requirements differ, comply with most stringent.
    - a. NFPA 70.
    - b. Requirements of authorities having jurisdiction.
  - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
  - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
  - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
  - 1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
    - d. HoldRite, a brand of Reliance Worldwide Corporation: [www.holdrite.com/#sle](http://www.holdrite.com/#sle).
  - 2. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
  - 3. Conduit Clamps: Bolted type unless otherwise indicated.
  - 4. Products:
    - a. Gripple, Inc; Universal Bracket: [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - b. Gripple, Inc; Fast Trak: [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - c. Gripple, Inc; Universal Clamp (Threaded): [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - d. Gripple, Inc; Low Profile Bracket Kits: [www.gripple.com/#sle](http://www.gripple.com/#sle).
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
  - 1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
    - d. HoldRite, a brand of Reliance Worldwide Corporation: [www.holdrite.com/#sle](http://www.holdrite.com/#sle).
- D. Metal Channel/Strut Framing Systems:
  - 1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Atkore International Inc; Unistrut: [www.unistrut.us/#sle](http://www.unistrut.us/#sle).
    - c. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - d. Source Limitations: Furnish channel/strut and associated fittings, accessories, and hardware produced by single manufacturer.
  - 2. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.

3. Comply with MFMA-4.
  4. Channel/Strut Used as Raceway, Where Indicated: Listed and labeled as complying with UL 5B.
  5. Channel Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
  6. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch (2.66 mm).
  7. Minimum Channel Dimensions: 1-5/8 inch (41 mm) wide by 13/16 inch (21 mm) high.
- E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2-inch (13 mm) diameter.
    - b. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch (6 mm) diameter.
    - c. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch (10 mm) diameter.
    - d. Trapeze Support for Multiple Conduits: 3/8-inch (10 mm) diameter.
    - e. Outlet Boxes: 1/4-inch (6 mm) diameter.
    - f. Luminaires: 1/4-inch (6 mm) diameter.
- F. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
1. Manufacturers:
    - a. Atkore International Inc; Unistrut: [www.unistrut.us/#sle](http://www.unistrut.us/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Green Link, Inc: [www.greenlinkengineering.com/#sle](http://www.greenlinkengineering.com/#sle).
    - d. PHP Systems/Design: [www.phpsd.com/#sle](http://www.phpsd.com/#sle).
  2. Description: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring attachment to roof structure and not penetrating roofing assembly, with support fixtures as specified.
  3. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
  5. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.
- G. Anchors and Fasteners:
1. Manufacturers - Mechanical Anchors:
    - a. Dewalt: [anchors.dewalt.com/#sle](http://anchors.dewalt.com/#sle).
    - b. Hilti, Inc: [www.hilti.com/#sle](http://www.hilti.com/#sle).
    - c. ITW Red Head, a division of Illinois Tool Works, Inc: [www.itwredhead.com/#sle](http://www.itwredhead.com/#sle).
    - d. Simpson Strong-Tie Company Inc: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
  2. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
  3. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  4. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  5. Hollow Masonry: Use toggle bolts.
  6. Hollow Stud Walls: Use toggle bolts.
  7. Steel: Use beam clamps, machine bolts, or welded threaded studs.
  8. Sheet Metal: Use sheet metal screws.
  9. Wood: Use wood screws.
  10. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    - a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
    - b. Comply with MFMA-4.
    - c. Channel Material: Use galvanized steel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. 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.
- I. Conduit Support and Attachment: See Section 260533.13 for additional requirements.
- J. Box Support and Attachment: See Section 260533.16 for additional requirements.
- K. Interior Luminaire Support and Attachment: See Section 265100 for additional requirements.
- L. Exterior Luminaire Support and Attachment: See Section 265600 for additional requirements.
- M. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- N. Secure fasteners in accordance with manufacturer's recommended torque settings.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**

**SECTION 260533.13**  
**CONDUIT FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel intermediate metal conduit (IMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Galvanized steel electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.
- G. Electrical nonmetallic tubing (ENT).
- H. Liquidtight flexible nonmetallic conduit (LFNC).
- I. High-density polyethylene (HDPE) conduit.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- C. Section 260526 - Grounding and Bonding for Electrical Systems.
- D. Section 260529 - Hangers and Supports for Electrical Systems.
- E. Section 260533.16 - Boxes for Electrical Systems.
- F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

**1.03 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2018.
- D. ASTM F2160 - Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD); 2016.
- E. ASTM F2176 - Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct; 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- G. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- H. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2017.
- I. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- J. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- K. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- L. NEMA TC 7 - Solid-Wall Coilable and Straight Electrical Polyethylene Conduit; 2021.
- M. NEMA TC 13 - Electrical Nonmetallic Tubing (ENT); 2014 (Reaffirmed 2019).
- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- O. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- P. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- Q. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- R. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- S. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- T. UL 651A - Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit; Current Edition, Including All Revisions.
- U. UL 746C - Polymeric Materials – Use in Electrical Equipment Evaluations; Current Edition, Including All Revisions.
- V. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- W. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- X. UL 1653 - Electrical Nonmetallic Tubing; Current Edition, Including All Revisions.
- Y. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.
- Z. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
  - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
  - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

#### **1.06 QUALITY ASSURANCE**

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

- C. Underground:
1. Under Slab on Grade: Use galvanized steel rigid metal conduit (RMC), aluminum rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
  2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
  3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
  4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) or schedule 80 rigid PVC conduit where emerging from underground.
  5. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows for bends.
  6. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth where soil has resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
  7. Where galvanized rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) emerges from concrete into soil, use field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches (100 mm) on either side of where conduit emerges.
- D. Embedded Within Concrete:
1. Within Slab on Grade: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC). Embed within structural slabs only where approved by Structural Engineer.
  2. Within Slab Above Ground: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC). Embed within structural slabs only where approved by Structural Engineer.
  3. Within Concrete Walls Above Ground: Use galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
  4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) where emerging from concrete.
- E. Concealed Within Masonry Walls: Use galvanized steel intermediate metal conduit (IMC) or galvanized steel electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel electrical metallic tubing (EMT).
- H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).
1. Locations subject to physical damage include, but are not limited to:
    - a. Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.
- J. Exposed, Interior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- K. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel intermediate metal conduit (IMC) or galvanized steel electrical metallic tubing (EMT).

- L. Exposed, Exterior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- M. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
  - 1. Maximum Length: 6 feet (1.8 m).
- N. Flexible Connections to Vibrating Equipment:
  - 1. Dry Locations: Use flexible metal conduit (FMC).
  - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
  - 3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
- O. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC) or galvanized steel electrical metallic tubing (EMT).

## **2.02 CONDUIT - GENERAL REQUIREMENTS**

- A. Comply with NFPA 70.
- B. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.
- C. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 3/4-inch (21 mm) trade size.
  - 2. Branch Circuit Homeruns: 3/4-inch (21 mm) trade size.
  - 3. Control Circuits: 1/2-inch (16 mm) trade size.
  - 4. Flexible Connections to Luminaires: 3/8-inch (12 mm) trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

## **2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)**

- A. Manufacturers:
  - 1. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 2. Nucor Tubular Products: [www.nucortubular.com/#sle](http://www.nucortubular.com/#sle).
  - 3. Rymco USA: [www.rymcousa.com/#sle](http://www.rymcousa.com/#sle).
  - 4. Western Tube, a division of Zekelman Industries: [www.westerntube.com/#sle](http://www.westerntube.com/#sle).
  - 5. Wheatland Tube, a division of Zekelman Industries: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
  - 1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
    - c. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - d. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  - 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
  - 3. Material: Use steel or malleable iron.
  - 4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

## **2.04 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)**

- A. Manufacturers:
  - 1. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 2. Nucor Tubular Products: [www.nucortubular.com/#sle](http://www.nucortubular.com/#sle).

3. Rymco USA: [www.rymcousa.com/#sle](http://www.rymcousa.com/#sle).
  4. Western Tube, a division of Zekelman Industries: [www.westerntube.com/#sle](http://www.westerntube.com/#sle).
  5. Wheatland Tube, a division of Zekelman Industries: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
    - c. Bridgeport Fittings, LLC: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - d. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
  3. Material: Use steel or malleable iron.
  4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

## **2.05 FLEXIBLE METAL CONDUIT (FMC)**

- A. Manufacturers:
1. Electri-Flex Company: [www.electriflex.com/#sle](http://www.electriflex.com/#sle).
  2. International Metal Hose: [www.metalhose.com/#sle](http://www.metalhose.com/#sle).
- B. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- C. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use steel or malleable iron.

## **2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)**

- A. Manufacturers:
1. AFC Cable Systems, a division of Atkore International: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  2. Electri-Flex Company: [www.electriflex.com/#sle](http://www.electriflex.com/#sle).
  3. International Metal Hose: [www.metalhose.com/#sle](http://www.metalhose.com/#sle).
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Bridgeport Fittings, LLC: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - c. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel or malleable iron.

## **2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)**

- A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  2. Nucor Tubular Products: [www.nucortubular/#sle](http://www.nucortubular/#sle).
  3. Rymco USA: [www.rymcousa.com/#sle](http://www.rymcousa.com/#sle).
  4. Western Tube, a division of Zekelman Industries: [www.westerntube.com/#sle](http://www.westerntube.com/#sle).
  5. Wheatland Tube, a division of Zekelman Industries: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.



- C. Fittings:
  - 1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
    - c. Bridgeport Fittings, LLC: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - d. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 3. Material: Use steel or malleable iron.
  - 4. Connectors and Couplings: Use compression/gland or set-screw type.
    - a. Do not use indenter type connectors and couplings.
  - 5. Embedded Within Concrete, Where Permitted: Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

## **2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT**

- A. Manufacturers:
  - 1. ABB; Carlon: [www.carlon.com/#sle](http://www.carlon.com/#sle).
  - 2. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 3. Cantex Inc: [www.cantexinc.com/#sle](http://www.cantexinc.com/#sle).
  - 4. Heritage Plastics, a division of Atkore International: [www.heritageplastics.com/#sle](http://www.heritageplastics.com/#sle).
  - 5. JM Eagle: [www.jmeagle.com/#sle](http://www.jmeagle.com/#sle).
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
  - 1. Manufacturer: Same as manufacturer of conduit to be connected.
  - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

## **2.09 ELECTRICAL NONMETALLIC TUBING (ENT)**

- A. Manufacturers:
  - 1. ABB; Carlon: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. Cantex Inc: [www.cantexinc.com/#sle](http://www.cantexinc.com/#sle).
  - 3. IPEX, a division of Aliaxis: [ww.ipexna.com/#sle](http://ww.ipexna.com/#sle).
- B. Description: NFPA 70, Type ENT electrical nonmetallic tubing complying with NEMA TC 13 and listed and labeled as complying with UL 1653.
- C. Fittings:
  - 1. Manufacturer: Same as manufacturer of ENT to be connected.
  - 2. Use solvent-welded type fittings.
  - 3. Solvent-Welded Fittings: Rigid PVC fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; suitable for use with ENT.

## **2.10 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)**

- A. Manufacturers:
  - 1. AFC Cable Systems, a division of Atkore International: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).
  - 2. IPEX, a division of Aliaxis: [www.ipexna.com/#sle](http://www.ipexna.com/#sle).
- B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- C. Fittings:
  - 1. Manufacturer: Same as manufacturer of conduit to be connected.
  - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for type of conduit to be connected.

### 2.11 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

- A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).
- B. Supports: As recommended by manufacturer.
- C. Fittings: Same type and manufacturer as conduit to be connected.

### 2.12 HIGH-DENSITY POLYETHYLENE (HDPE) CONDUIT

- A. Manufacturers:
  - 1. ABB; Carlon: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. Blue Diamond Industries, LLC: [www.bdiky.com/#sle](http://www.bdiky.com/#sle).
  - 3. Eastern Wire + Conduit, a division of Atkore International: [www.easternwire.com/#sle](http://www.easternwire.com/#sle).
- B. Description: NFPA 70, Type HDPE high-density polyethylene solid-wall conduit complying with ASTM F2160 and NEMA TC 7; list and label as complying with UL 651A; Schedule 40 unless otherwise indicated.
- C. Joining Methods: Approved by HDPE conduit manufacturer.
- D. Mechanical Fittings: Comply with ASTM F2176; list and label as complying with UL 651A.

### 2.13 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch (0.51 mm).
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Epoxy Adhesive for RTRC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- E. Adhesive for HDPE and RTRC Conduit:
  - 1. Specifically designed for bonding dissimilar materials in lieu of transition fittings, including but not limited to polyethylene, fiberglass, PVC, aluminum, and steel; UL 746C recognized.
  - 2. Approved by adhesive manufacturer for use with materials to be joined.
  - 3. Products:
    - a. American Polywater Corporation; Polywater BonDuit Conduit Adhesive: [www.polywater.com/#sle](http://www.polywater.com/#sle).
- F. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf (5.6 kN).
- G. Conduit Mechanical Seals:
  - 1. Listed as complying with UL 514B.
  - 2. Specifically designed for sealing conduit openings against water, moisture, gases, and dust.
  - 3. Suitable for sealing around conductors/cables to be installed.
- H. Sealing Systems for Concrete Penetrations:
  - 1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
  - 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.
  - 3. Products:
    - a. American Polywater Corporation; PZVR Cement-Coated Concrete Wall Sleeves: [www.polywater-haufftechnik.com/#sle](http://www.polywater-haufftechnik.com/#sle).
    - b. American Polywater Corporation; PHSD Mechanical Seals: [www.polywater-haufftechnik.com/#sle](http://www.polywater-haufftechnik.com/#sle).
    - c. American Polywater Corporation; PHSI 150 Varia Double Wall Inserts: [www.polywater-haufftechnik.com/#sle](http://www.polywater-haufftechnik.com/#sle).

- d. American Polywater Corporation; PGKD Modular Seals: [www.polywater-haufftechnik.com/#sle](http://www.polywater-haufftechnik.com/#sle).
- I. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
  - 1. Products:
    - a. Alta Products, LLC; Sigrist Pipe Chase Housing, Curbs, and Exit Seals: [www.altaproductsllc.com/#sle](http://www.altaproductsllc.com/#sle).
    - b. Menzies Metal Products; Electrical Roof Stack and Cap: [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).
    - c. Menzies Metal Products; Electrical Retro Box: [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Intermediate Metal Conduit (IMC): Install in accordance with NECA 101.
- E. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.
- F. Electrical Nonmetallic Tubing (ENT): Install in accordance with NECA 111.
- G. Liquidtight Flexible Nonmetallic Conduit (LFNC): Install in accordance with NECA 111.
- H. Conduit Routing:
  - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
  - 2. When conduit destination is indicated without specific routing, determine exact routing required.
  - 3. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.
    - c. Within joists in areas with no ceiling.
  - 4. Arrange conduit to maintain adequate headroom, clearances, and access.
  - 5. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
  - 6. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
  - 7. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
  - 8. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
  - 9. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces.
- I. Conduit Support:
  - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
  - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
  - 4. Use conduit strap to support single surface-mounted conduit.

- a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
  5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
  6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
  7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
  8. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
  9. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.
- J. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  3. Use suitable adapters where required to transition from one type of conduit to another.
  4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
  7. Secure joints and connections to provide mechanical strength and electrical continuity.
- K. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  2. Make penetrations perpendicular to surfaces unless otherwise indicated.
  3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
  4. Conceal bends for conduit risers emerging above ground.
  5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
  7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 078400.
- L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment.
1. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
  2. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
- M. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
    - a. Where conduits enter building from outside.
    - b. Where service conduits enter building from underground distribution system.
    - c. Where conduits enter building from underground.
    - d. Where conduits may transport moisture to contact live parts.

2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
  - a. Where conduits pass from outdoors into conditioned interior spaces.
  - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

N. Provide grounding and bonding; see Section 260526.

O. Identify conduits; see Section 260553.

### **3.03 FIELD QUALITY CONTROL**

A. See Section 014000 - Quality Requirements for additional requirements.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective conduits.

### **3.04 CLEANING**

A. Clean interior of conduits to remove moisture and foreign matter.

### **3.05 PROTECTION**

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

**END OF SECTION**

**SECTION 260533.16**  
**BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
- C. Boxes and enclosures for integrated power, data, and audio/video.
- D. Floor boxes.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260533.13 - Conduit for Electrical Systems:
  - 1. Conduit bodies and other fittings.
  - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 262726 - Wiring Devices:
  - 1. Wall plates.
  - 2. Floor box service fittings.
  - 3. Additional requirements for locating boxes for wiring devices.
- F. Section 271000 - Structured Cabling: Additional requirements for communications systems outlet boxes.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.

3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for junction and pull boxes.
- B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. Keys for Lockable Enclosures: Two of each different key.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 BOXES**

- A. General Requirements:
  1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
  2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  3. Provide products listed, classified, and labeled as suitable for the purpose intended.
  4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
  5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
  1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
  2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
  3. Use suitable concrete type boxes where flush-mounted in concrete.
  4. Use suitable masonry type boxes where flush-mounted in masonry walls.
  5. Use raised covers suitable for the type of wall construction and device configuration where required.
  6. Use shallow boxes where required by the type of wall construction.
  7. Do not use "through-wall" boxes designed for access from both sides of wall.
  8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
  9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
  10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
  11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.

12. Minimum Box Size, Unless Otherwise Indicated:
  - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
  - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
  - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
13. Wall Plates: Comply with Section 262726.
14. Manufacturers:
  - a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  - b. E-Lids LLC: [www.e-lids.com/#sle](http://www.e-lids.com/#sle).
  - c. Hubbell Incorporated; Bell Products: [www.hubbell-rtb.com/#sle](http://www.hubbell-rtb.com/#sle).
  - d. Hubbell Incorporated; RACO Products: [www.hubbell-rtb.com/#sle](http://www.hubbell-rtb.com/#sle).
  - e. O-Z/Gedney, a brand of Emerson Electric Co: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  - f. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
  1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
  2. NEMA 250 Environment Type, Unless Otherwise Indicated:
    - a. Indoor Clean, Dry Locations: Type 1, painted steel.
    - b. Outdoor Locations: Type 3R, painted steel.
  3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
    - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
    - b. Boxes 6 square feet (0.56 sq m) and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
  4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
  5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
  6. Manufacturers:
    - a. Cooper B-Line, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
    - b. Hoffman, a brand of Pentair Technical Products: [www.hoffmanonline.com/#sle](http://www.hoffmanonline.com/#sle).
    - c. Hubbell Incorporated; Wiegmann Products: [www.hubbell-wiegmann.com/#sle](http://www.hubbell-wiegmann.com/#sle).
- D. Boxes and Enclosures for Integrated Power, Data, and Audio/Video: Size and configuration as indicated or as required with partitions to separate services; field-connected gangable boxes may be used.
  1. Manufacturers:
    - a. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).
- E. Floor Boxes:
  1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
  2. Use cast iron floor boxes within slab on grade.
  3. Use sheet-steel or cast iron floor boxes within slab above grade.
  4. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
  5. Manufacturer: Same as manufacturer of floor box service fittings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.



- C. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- G. Box Locations:
  - 1. Locate boxes as required for devices installed under other sections or by others.
    - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
    - b. Communications Systems Outlets: Comply with Section 271000.
  - 2. Locate boxes so that wall plates do not span different building finishes.
  - 3. Locate boxes so that wall plates do not cross masonry joints.
  - 4. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
  - 5. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
  - 6. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
    - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
  - 7. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
  - 8. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    - a. Concealed above accessible suspended ceilings.
    - b. Within joists in areas with no ceiling.
    - c. Electrical rooms.
    - d. Mechanical equipment rooms.
    - e. Supply air tunnels.
- H. Box Supports:
  - 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
  - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
  - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
  - 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- I. Install boxes plumb and level.
- J. Flush-Mounted Boxes:
  - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface

- more than 1/4 inch (6 mm) or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- K. Install boxes as required to preserve insulation integrity.
- L. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.
- M. Nonmetallic Floor Boxes: Cut box flush with finished floor after concrete pour.
- N. Close unused box openings.
- O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated spare or for future use.
- P. Provide grounding and bonding in accordance with Section 260526.
- Q. Identify boxes in accordance with Section 260553.

**3.03 CLEANING**

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

**3.04 PROTECTION**

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

**END OF SECTION**



**SECTION 260553  
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Underground warning tape.
- E. Warning signs and labels.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 260573 - Power System Studies: Arc flash hazard warning labels.
- C. Section 271000 - Structured Cabling: Identification for communications cabling and devices.

**1.03 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

**1.07 FIELD CONDITIONS**

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION REQUIREMENTS**

- A. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Switchboards:
      - 1) Identify ampere rating.
      - 2) Identify voltage and phase.
      - 3) Identify power source and circuit number. Include location when not within sight of equipment.
      - 4) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

- b. Panelboards:
  - 1) Identify ampere rating.
  - 2) Identify voltage and phase.
  - 3) Identify power source and circuit number. Include location when not within sight of equipment.
  - 4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
  - 5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
- c. Enclosed switches, circuit breakers, and motor controllers:
  - 1) Identify power source and circuit number. Include location when not within sight of equipment.
  - 2) Identify load(s) served. Include location when not within sight of equipment.
- d. Enclosed Contactors:
  - 1) Identify ampere rating.
  - 2) Identify voltage and phase.
  - 3) Identify load(s) and associated circuits controlled. Include location.
- 2. Service Equipment:
  - a. Use identification nameplate to identify each service disconnecting means.
- 3. Arc Flash Hazard Warning Labels: Comply with Section 260573.
- B. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
  - 2. Identification for Communications Conductors and Cables: Comply with Section 271000.
- C. Identification for Boxes:
  - 1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
- D. Identification for Devices:
  - 1. Wiring Device and Wallplate Finishes: Comply with Section 262726.
  - 2. Use identification label to identify fire alarm system devices.
  - 3. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
  - 4. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

## 2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
  - 1. Manufacturers:
    - a. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
    - b. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
    - c. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
  - 2. Materials:
    - a. Indoor Clean, Dry Locations: Use plastic nameplates.
    - b. Outdoor Locations: Use plastic nameplates suitable for exterior use.
  - 3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
  - 4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
  - 1. Manufacturers:
    - a. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
    - b. Brother International Corporation: [www.brother-usa.com/#sle](http://www.brother-usa.com/#sle).
    - c. Panduit Corp: [www.panduit.com/#sle](http://www.panduit.com/#sle).

2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
  3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
  2. Legend:
    - a. System designation where applicable:
      - 1) Fire Alarm System: Identify with text "FIRE ALARM".
    - b. Equipment designation or other approved description.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height:
    - a. System Designation: 1 inch (25 mm).
    - b. Equipment Designation: 1/2 inch (13 mm).
  5. Color:
    - a. Normal Power System: White text on black background.
    - b. Fire Alarm System: White text on red background.
- D. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
  2. Legend: Power source and circuit number or other designation indicated.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch (5 mm).
  5. Color: Black text on clear background.
- E. Format for Fire Alarm Device Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
  2. Legend: Designation indicated and device zone or address.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch (5 mm).
  5. Color: Red text on white background.

### **2.03 WIRE AND CABLE MARKERS**

- A. Manufacturers:
1. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  2. HellermannTyton: [www.hellermanntyton.com/#sle](http://www.hellermanntyton.com/#sle).
  3. Panduit Corp: [www.panduit.com/#sle](http://www.panduit.com/#sle).
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth or wrap-around self-adhesive vinyl self-laminating type markers suitable for the conductor or cable to be identified.
- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- F. Minimum Text Height: 1/8 inch (3 mm).
- G. Color: Black text on white background unless otherwise indicated.

### **2.04 UNDERGROUND WARNING TAPE**

- A. Manufacturers:
1. Brady Corporation: [www.bradyid.com/#sle](http://www.bradyid.com/#sle).
  2. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  3. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

- C. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:
  - 1. Tape for Buried Power Lines: Black text on red background.
  - 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

## **2.05 WARNING SIGNS AND LABELS**

- A. Manufacturers:
  - 1. Brimar Industries, Inc: [www.brimar.com/#sle](http://www.brimar.com/#sle).
  - 2. Clarion Safety Systems, LLC: [www.clarionsafety.com/#sle](http://www.clarionsafety.com/#sle).
  - 3. Insite Solutions, LLC: [www.stop-painting.com/#sle](http://www.stop-painting.com/#sle).
  - 4. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- C. 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 (178 by 254 mm) unless otherwise indicated.
- D. 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.
  - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
  - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  - 1. Surface-Mounted Equipment: Enclosure front.
  - 2. Flush-Mounted Equipment: Inside of equipment door.
  - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  - 4. Elevated Equipment: Legible from the floor or working platform.
  - 5. Branch Devices: Adjacent to device.
  - 6. Interior Components: Legible from the point of access.
  - 7. Boxes: Outside face of cover.
  - 8. Conductors and Cables: Legible from the point of access.
  - 9. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.
- G. Secure rigid signs using stainless steel screws.
- H. Mark all handwritten text, where permitted, to be neat and legible.

**3.03 FIELD QUALITY CONTROL**

- A. Replace existing and new self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

**END OF SECTION**





**SECTION 260923  
LIGHTING CONTROL DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Occupancy sensors.
- B. Daylighting controls.
- C. Lighting contactors.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 262726 - Wiring Devices: Devices for manual control of lighting, including wall switches and wall dimmers.
- F. Section 265100 - Interior Lighting.
- G. Section 265600 - Exterior Lighting.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
  - 3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
  - 4. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
  - 5. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
  - 1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.
- B. Shop Drawings:
  - 1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.
  - 2. Daylighting Controls: Provide lighting plan indicating location, model number, and orientation of each photo sensor and associated system component.

- C. Field Quality Control Reports.
- D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed locations and settings for lighting control devices.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

#### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

#### **1.08 FIELD CONDITIONS**

#### **1.09 WARRANTY**

- A. Provide five year manufacturer warranty for all occupancy sensors.

### **PART 2 PRODUCTS**

#### **2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS**

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

#### **2.02 OCCUPANCY SENSORS**

- A. Manufacturers:
  - 1. Acuity Brands, Inc: [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
  - 2. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).
  - 3. Intermatic, Inc: [www.intermatic.com/#sle](http://www.intermatic.com/#sle).
  - 4. Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
  - 5. Lutron Electronics Company, Inc: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 6. RAB Lighting, Inc: [www.rablighting.com/#sle](http://www.rablighting.com/#sle).
- B. All Occupancy Sensors:
  - 1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
  - 2. Sensor Technology:
    - a. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.
  - 3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
  - 4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
  - 5. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
  - 6. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
  - 7. Load Rating for Line Voltage Occupancy Sensors:
    - a. LED Load: Not less than 800 W.
- C. Wall Switch Occupancy Sensors:
  - 1. All Wall Switch Occupancy Sensors:

- a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
  - b. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
  - c. Finish: Color to be selected.
2. Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).
    - a. Products:
      - 1) Lutron Maestro Series; [www.lutron.com/#sle](http://www.lutron.com/#sle).
- D. Wall Dimmer Occupancy Sensors:
1. General Requirements:
    - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability, and no leakage current to load in off mode.
    - b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
    - c. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
    - d. Finish: Color to be selected<>.
- E. Ceiling Mounted Occupancy Sensors:
1. All Ceiling Mounted Occupancy Sensors:
    - a. Description: Low profile occupancy sensors designed for ceiling installation.
    - b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
    - c. Finish: White unless otherwise indicated.
  2. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:
    - a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
      - 1) Products:
        - (a) Lutron LOS-CDT Series; [www.lutron.com/#sle](http://www.lutron.com/#sle).
    - b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
      - 1) Products:
  3. Passive Infrared/Acoustic Dual Technology Ceiling Mounted Occupancy Sensors:
    - a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
    - b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq m) at a mounting height of 9 feet (2.7 m).
- F. Luminaire Mounted Occupancy Sensors: Designed for direct luminaire installation and control, suitable for use with specified luminaires.
- G. Power Packs for Low Voltage Occupancy Sensors:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
  2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
  3. Input Supply Voltage: Dual rated for 120/277 V ac.

4. Load Rating:
  - a. LED Load: Not less than 15 A.

### 2.03 DAYLIGHTING CONTROLS

- A. Manufacturers:
  1. Hubbell Control Solutions: [www.hubbell.com/hubbellcontrolsolutions/en/#sle](http://www.hubbell.com/hubbellcontrolsolutions/en/#sle). Hubbell Control Solutions: [www.hubbell.com/hubbellcontrolsolutions/en/#sle](http://www.hubbell.com/hubbellcontrolsolutions/en/#sle). Hubbell Control Solutions: [www.hubbell.com/hubbellcontrolsolutions/en/#sle](http://www.hubbell.com/hubbellcontrolsolutions/en/#sle).
  2. Lutron Electronics Company, Inc: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  3. Sensor Switch Inc: [www.sensorswitch.com/#sle](http://www.sensorswitch.com/#sle).
- B. System Description: Control system consisting of photo sensors and compatible control modules and power packs, contactors, or relays as required for automatic control of load indicated according to available natural light; capable of integrating with occupancy sensors and manual override controls.
- C. Daylighting Control Photo Sensors: Low voltage class 2 photo sensor units with output signal proportional to the measured light level and provision for zero or offset based signal.
  1. Sensor Type: Filtered silicon photo diode.
  2. Sensor Range:
    - a. Indoor Photo Sensors: 5 to 100 footcandles (53.8 to 1,080 lx).
- D. Daylighting Control Dimming Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors and with specified dimming ballasts, for both continuous dimming of compatible dimming ballasts and switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
  1. Operation: Unless otherwise indicated, specified load to be continuously brightened as not enough daylight becomes available and continuously dimmed as enough daylight becomes available.
  2. Control Capability: Capable of controlling up to three separately programmable channels, with up to 50 ballasts per channel.
  3. Dimming and Fade Rates: Adjustable from 5 to 60 seconds.
  4. Cut-Off Delay: Selectable and adjustable from 0 to 20 minutes.
- E. Power Packs for Low Voltage Daylighting Control Modules:
  1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage daylighting control modules for switching of line voltage loads. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
  2. Input Supply Voltage: Dual rated for 120/277 V ac.
  3. Load Ratings: As required to control the load indicated on drawings.

### 2.04 LIGHTING CONTACTORS

- A. Manufacturers:
  1. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  2. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
  3. Schneider Electric: [www.se.com/#sle](http://www.se.com/#sle).
- B. Description: Magnetic lighting contactors complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; noncombination type unless otherwise indicated; ratings, configurations and features as indicated on the drawings.
- C. Short Circuit Current Rating:
  1. Provide contactors with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Enclosures:
  1. Comply with NEMA ICS 6.
  2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

3. Finish: Manufacturer's standard unless otherwise indicated.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.
- F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.
- G. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

#### **3.03 INSTALLATION**

- A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.
  1. Mounting Heights: Unless otherwise indicated, as follows:
    - a. Wall Switch Occupancy Sensors: 48 inches (1.2 m) above finished floor.
  2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
  3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
- C. Install lighting control devices in accordance with manufacturer's instructions.
- D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- E. Install lighting control devices plumb and level, and held securely in place.
- F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.
- G. Provide required supports in accordance with Section 260529.
- H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- I. Occupancy Sensor Locations:
  1. Location Adjustments: Within the design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage.
  2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet (1.2 m) from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

- J. Daylighting Control Photo Sensor Locations:
  - 1. Location Adjustments: Within the design intent, reasonably minor adjustments to locations may be made in order to optimize control and avoid conflicts or problems affecting proper detection of light levels.
  - 2. Unless otherwise indicated, locate photo sensors for closed loop systems to accurately measure the light level controlled at the designated task location, while minimizing the measured amount of direct light from natural or artificial sources such as windows or pendant luminaires.
  - 3. Unless otherwise indicated, locate photo sensors for open loop systems to accurately measure the level of daylight coming into the space, while minimizing the measured amount of lighting from artificial sources.
- K. Combination Enclosed Lighting Contactors:
  - 1. Except where indicated to be mounted adjacent to the equipment they supply, mount lighting contactors such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- L. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.
- M. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each lighting control device for damage and defects.
- B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
- C. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable. Record test results in written report to be included with submittals.
- D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

#### **3.05 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
- C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.
- D. Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated or as directed by Architect. Record settings in written report to be included with submittals. Readjust controls calibrated prior to installation of final room finishes, furniture, and window treatments that do not function properly as determined by Architect.

#### **3.06 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

#### **3.07 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.

**END OF SECTION**

**SECTION 262413  
SWITCHBOARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Low-voltage (600 V and less) switchboards and associated accessories for service and distribution applications.
- B. Overcurrent protective devices for switchboards.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 400 - Standard for Installing and Maintaining Switchboards; 2007.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. NEMA PB 2 - Deadfront Distribution Switchboards; 2011.
- F. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 1000 Volts or Less; 2023.
- G. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- J. UL 891 - Switchboards; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
  - 4. Coordinate with manufacturer to provide shipping splits suitable for the dimensional constraints of the installation.
  - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for switchboards, enclosures, overcurrent protective devices, and other installed components and accessories.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.



### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store switchboards in accordance with manufacturer's instructions, NECA 400, and NEMA PB 2.1.
- B. Store in a clean, dry space having a uniform temperature to prevent condensation (including outdoor switchboards, which are not weatherproof until completely and properly installed). Where necessary, provide temporary enclosure space heaters or temporary power for permanent factory-installed space heaters.
- C. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- D. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Switchboards:
  - 1. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
  - 3. Schneider Electric: [www.se.com/#sle](http://www.se.com/#sle).
  - 4. Siemens Industry, Inc: [www.new.siemens.com/#sle](http://www.new.siemens.com/#sle).

### 2.02 SWITCHBOARDS

- A. Provide switchboards consisting of all required components, control power transformers, instrumentation and control wiring, accessories, etc. as necessary for a complete operating system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.
- D. Service Conditions:
  - 1. Provide switchboards and associated components suitable for operation under the following service conditions without derating:
    - a. Altitude: Less than 6,600 feet (2,000 m).
    - b. Ambient Temperature:
      - 1) Switchboards Containing Molded Case or Insulated Case Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
  - 2. Provide switchboards and associated components suitable for operation at indicated ratings under the service conditions at the installed location.
- E. Short Circuit Current Rating:
  - 1. Provide switchboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- F. Main Devices: Configure for top or bottom incoming feed as indicated or as required for the installation. Provide separate pull section and/or top-mounted pullbox as indicated or as required to facilitate installation of incoming feed.
- G. Bussing: Sized in accordance with UL 891 temperature rise requirements.
  - 1. Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
  - 2. Provide solidly bonded equipment ground bus through full length of switchboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
  - 3. Phase and Neutral Bus Material: Copper.
  - 4. Ground Bus Material: Copper.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
  - 1. Line Conductor Terminations:

- a. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
- b. Main and Neutral Lug Type: Mechanical.
- 2. Load Conductor Terminations:
  - a. Lug Material: Copper, suitable for terminating copper conductors only.
  - b. Lug Type:
    - 1) Provide mechanical lugs unless otherwise indicated.
- I. Enclosures:
  - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1 or Type 2 (drip-proof).
  - 2. Finish: Manufacturer's standard unless otherwise indicated.
- J. Future Provisions:
  - 1. Prepare designated spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
  - 2. Equip distribution sections with full height vertical bussing to accommodate maximum utilization of space for devices.

### **2.03 OVERCURRENT PROTECTIVE DEVICES**

- A. Circuit Breakers:
  - 1. Interrupting Capacity:
    - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than specified minimum requirements.
    - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
  - 2. Molded Case Circuit Breakers:
    - a. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
  - 3. Insulated Case Circuit Breakers:
    - a. Description: Quick-make, quick-break, trip-free circuit breakers with two-step stored energy closing mechanism; standard 80 percent rated unless otherwise indicated; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
    - b. Trip Units: Solid state, microprocessor-based, true rms sensing.

### **2.04 SOURCE QUALITY CONTROL**

- A. Factory test switchboards according to NEMA PB 2, including the following production (routine) tests on each switchboard assembly or component:
  - 1. Dielectric tests.
  - 2. Mechanical operation tests.
  - 3. Grounding of instrument transformer cases test.
  - 4. Electrical operation and control wiring tests, including polarity and sequence tests.
  - 5. Ground-fault sensing equipment test.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the switchboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive switchboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install switchboards in accordance with NECA 1 (general workmanship), NECA 400, and NEMA PB 2.1.
- C. Arrange equipment to provide required clearances and maintenance access, including accommodations for any drawout devices.
- D. Where switchboard is indicated to be mounted with inaccessible side against wall, provide minimum clearance of 1/2 inch (10 mm) between switchboard and wall.
- E. Provide required support and attachment in accordance with Section 260529.
- F. Install switchboards plumb and level.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Install all field-installed devices, components, and accessories.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Provide filler plates to cover unused spaces in switchboards.

### **3.03 FIELD QUALITY CONTROL**

- A. Before energizing switchboard, perform insulation resistance testing in accordance with NECA 400 and NEMA PB 2.1.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.1.
- D. Molded Case and Insulated Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers. Tests listed as optional are not required.
- E. Correct deficiencies and replace damaged or defective switchboards or associated components.

### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of switchboard covers and doors.

### **3.05 CLEANING**

- A. Clean dirt and debris from switchboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred surfaces to match original factory finish.

### **3.06 PROTECTION**

- A. Protect installed switchboards from subsequent construction operations.

**END OF SECTION**

**SECTION 262416  
PANELBOARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000 Volts or Less; 2023.
- G. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 67 - Panelboards; Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
  - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

## 1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. 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.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
- B. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
- C. Schneider Electric: [www.se.com/#sle](http://www.se.com/#sle).
- D. Siemens Industry, Inc: [www.new.siemens.com/#sle](http://www.new.siemens.com/#sle).

### 2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
  - 1. Altitude: Less than 6,600 feet (2,000 m).
  - 2. Ambient Temperature:
    - a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- C. Short Circuit Current Rating:
  - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
  - 1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.
  - 2. Boxes: Galvanized steel unless otherwise indicated.
    - a. Provide wiring gutters sized to accommodate the conductors to be installed.
  - 3. Fronts:
    - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
  - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- J. Load centers are not acceptable.

### 2.03 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
  - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
  - 1. Phase and Neutral Bus Material: Copper.
  - 2. Ground Bus Material: Copper.
- D. Circuit Breakers:
  - 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
- E. Enclosures:
  - 1. Provide surface-mounted enclosures unless otherwise indicated.
  - 2. Fronts: Provide trims to cover access to load terminals, wiring gutters, and other live parts, with exposed access to overcurrent protective device handles.

### 2.04 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
  - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
  - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
  - 2. Phase and Neutral Bus Material: Copper.
  - 3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
  - 1. Provide surface-mounted enclosures as indicated.
  - 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
  - 3. Provide clear plastic circuit directory holder mounted on inside of door.

### 2.05 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
  - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
  - 2. Interrupting Capacity:
    - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
    - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
  - 3. Conductor Terminations:
    - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Do not use tandem circuit breakers.
7. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

## **2.06 SOURCE QUALITY CONTROL**

- A. Factory test panelboards according to NEMA PB 1.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 260529.
- F. Install panelboards plumb.
- G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 260526.
- I. Install all field-installed branch devices, components, and accessories.
- J. Provide filler plates to cover unused spaces in panelboards.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers. Tests listed as optional are not required.
- C. Correct deficiencies and replace damaged or defective panelboards or associated components.

### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

### **3.05 CLEANING**

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

**END OF SECTION**

**SECTION 262726  
WIRING DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall switches.
- B. Wall dimmers.
- C. Fan speed controllers.
- D. Receptacles.
- E. Wall plates and covers.
- F. Floor box service fittings.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); 2017g, with Amendment.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- L. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- M. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.
- N. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.
- O. UL 1917 - Solid-State Fan Speed Controls; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
  - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
  - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.



### 1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
  - 1. Wall Dimmers: Include derating information for ganged multiple devices.

### 1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

### 1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

## PART 2 PRODUCTS

### 2.01 WIRING DEVICES - GENERAL REQUIREMENTS

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Wiring Device Applications:
  - 1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.
  - 2. Provide GFCI protection for:
    - a. Receptacles installed within 6 feet (1.8 m) of sinks.
    - b. Receptacles installed in kitchens.
    - c. Receptacles serving electric drinking fountains.
  - 3. Single Receptacles Installed on Individual Branch Circuits: Provide receptacle ampere rating equal to branch circuit rating.
- C. Wiring Device Finishes:
  - 1. Provide wiring device finishes as described below, unless otherwise indicated.
  - 2. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.
  - 3. Wiring Devices Installed in Wet or Damp Locations: White with weatherproof cover.
  - 4. Flush Floor Box Service Fittings: Gray wiring devices with aluminum cover and ring/flange.

### 2.02 WALL SWITCHES

- A. Manufacturers:
  - 1. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).
  - 2. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

### 2.03 WALL DIMMERS

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 2. Lutron Electronics Company, Inc; Maestro Series: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Wall Dimmers - General Requirements: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for

load controlled as indicated on the drawings.

- C. Power Rating:
  - 1. LED: 600 W.
  - 2. Electronic Low-Voltage: 400 VA.
- D. Provide locator light, illuminated with load off.
- E. Provide accessory wall switches to match dimmer appearance when installed adjacent to each other.

#### **2.04 FAN SPEED CONTROLLERS**

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 2. Lutron Electronics Company, Inc; Maestro Series: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 3. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Description: 120 V AC, solid-state, full-range variable speed, slide control type with separate on/off switch, with integral radio frequency interference filtering, fan noise elimination circuitry, power failure preset memory, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1917.

#### **2.05 RECEPTACLES**

- A. Manufacturers:
  - 1. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).
  - 2. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 3. Lutron Electronics Company, Inc; Designer Style: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 4. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  - 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
  - 1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated.
  - 2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
  - 3. Tamper Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
  - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
    - a. Provide test and reset buttons of same color as device.
  - 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
  - 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.
  - 4. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.
- E. USB Charging Devices:
  - 1. USB Charging Devices - General Requirements: Listed as complying with UL 1310.

## 2.06 WALL PLATES AND COVERS

- A. Manufacturers:
  - 1. Hubbell Incorporated: [www.hubbell-wiring.com/#sle](http://www.hubbell-wiring.com/#sle).
  - 2. Intermatic, Inc: [www.intermatic.com/#sle](http://www.intermatic.com/#sle).
  - 3. Leviton Manufacturing Company, Inc: [www.leviton.com/#sle](http://www.leviton.com/#sle).
  - 4. Lutron Electronics Company, Inc: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 5. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Wall Plates: Comply with UL 514D.
  - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  - 2. Size: Standard.
  - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.
- D. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- E. Weatherproof Switch Covers for Wet or Damp Locations: Gasketed, metallic, with externally operable actuating means and corrosion-resistant screws; listed as suitable for use in wet locations.

## 2.07 FLOOR BOX SERVICE FITTINGS

- A. Manufacturers:
  - 1. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).
  - 2. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
  - 3. Wiremold, a brand of Legrand North America, Inc: [www.legrand.us/#sle](http://www.legrand.us/#sle).
- B. Description: Service fittings compatible with floor boxes provided under Section 260533.16 with components, adapters, and trims required for complete installation.
- C. Flush Floor Service Fittings:
  - 1. Dual Service Flush Combination Outlets:
    - a. Cover: Rectangular.
    - b. Configuration:
      - 1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
      - 2) Communications: Empty single gang box for configuration by owner with duplex flap opening.
      - 3) Voice, Data Jacks and cover plate: Provided by others.
  - 2. Accessories:
    - a. Tile Rings: Finish to match covers; configuration as required to accommodate specified covers.
    - b. Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.
  - 3. Products:
    - a. Hubbell Incorporated: [www.hubbell.com/#sle](http://www.hubbell.com/#sle).

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

- F. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.03 INSTALLATION**

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
  - 1. Mounting Heights: Unless otherwise indicated, as follows:
    - a. Wall Switches: 48 inches (1200 mm) above finished floor.
    - b. Wall Dimmers: 48 inches (1200 mm) above finished floor.
    - c. Fan Speed Controllers: 48 inches (1200 mm) above finished floor.
    - d. Receptacles: 18 inches (450 mm) above finished floor or 6 inches (150 mm) above counter.
  - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
  - 3. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
  - 4. Locate wall switches on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
  - 5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.
- J. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- K. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each wiring device for damage and defects.

- B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- C. Test each receptacle to verify operation and proper polarity.
- D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

**3.05 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.

**3.06 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

**END OF SECTION**

**SECTION 262816.16  
ENCLOSED SWITCHES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Enclosed safety switches.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 262913 - Enclosed Controllers: Manual motor controllers.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
  - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

**1.07 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.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

### 1.08 FIELD CONDITIONS

- A. Maintain ambient temperature between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C) during and after installation of enclosed switches.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
- B. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
- C. Schneider Electric: [www.se.com/#sle](http://www.se.com/#sle).
- D. Siemens Industry, Inc: [www.new.siemens.com/#sle](http://www.new.siemens.com/#sle).

### 2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
  - 1. Altitude: Less than 6,600 feet (2,000 m).
  - 2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
  - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
  - 2. Minimum Ratings:
    - a. Switches Protected by Class H Fuses: 10,000 rms symmetrical amperes.
    - b. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.
    - b. Outdoor Locations: Type 3R.
  - 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- M. Heavy Duty Switches:
  - 1. Comply with NEMA KS 1.
  - 2. Conductor Terminations:
    - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.

#### **3.03 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

#### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

#### **3.05 CLEANING**

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

**END OF SECTION**





**SECTION 264300  
SURGE PROTECTIVE DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surge protective devices for service entrance locations.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 262413 - Switchboards.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. SPD: Surge Protective Device.

**1.04 REFERENCE STANDARDS**

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to ordering equipment.

**1.06 SUBMITTALS**

- A. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.
- B. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

**1.07 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.08 DELIVERY, STORAGE, AND PROTECTION**

- A. Store in a clean, dry space in accordance with manufacturer's written instructions.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Field-Installed, Externally Mounted Surge Protective Devices:
  - 1. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. Intermatic, Inc: [www.intermatic.com/#sle](http://www.intermatic.com/#sle).
  - 3. nVent ERICO: [www.nvent.com/#sle](http://www.nvent.com/#sle).
  - 4. Schneider Electric: [www.se.com/#sle](http://www.se.com/#sle).
  - 5. Surge Suppression, LLC (SSI): [www.surgesuppression.com/#sle](http://www.surgesuppression.com/#sle).
- B. Factory-installed, Internally Mounted Surge Protective Devices:
  - 1. Same as manufacturer of equipment containing surge protective device, to provide complete listed assembly including SPD.

## 2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mounted SPDs.
- C. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.
- D. Protected Modes:
  - 1. Wye Systems: L-N, L-G, N-G, L-L.
- E. UL 1449 Voltage Protection Ratings (VPRs):
  - 1. 208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
- F. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- G. Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
  - 1. Indoor clean, dry locations: Type 1.
- H. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
  - 1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.
- I. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.
  - 1. Switchboards: See Section 262413.

## 2.03 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

- A. Surge Protective Device - Basis of Design: Surge Suppression, LLC (SSI); Advantage Series; Model LSED (240 kA/phase, Type 1, I-n = 20 kA); [www.surgesuppression.com/#sle](http://www.surgesuppression.com/#sle).
  - 1. Voltage: As indicated on drawings.
  - 2. Features: Discrete "all-mode" protection (10 modes for 3-phase wye circuits); component-level thermal fusing; internal circuit board-mounted overcurrent fusing; 200 kAIC SCCR; 25 year warranty.
  - 3. Include the following options:
    - a. AC10 - Basic internal audible alarm with dry relay contacts.
    - b. M - NEMA 12 steel enclosure.
    - c. P - Flush mount plate.
- B. Surge Protective Device:
  - 1. Protection Circuits: Field-replaceable modular or non-modular.
  - 2. Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.
  - 3. UL 1449 Nominal Discharge Current (I-n): 20 kA.
  - 4. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
  - 5. Diagnostics:
    - a. Protection Status Monitoring: Provide indicator lights to report the protection for each phase.
    - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.

**END OF SECTION**

**SECTION 265100  
INTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior luminaires.
- B. Exit signs.
- C. Ballasts and drivers.

**1.02 RELATED REQUIREMENTS**

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 260533.16 - Boxes for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 260923 - Lighting Control Devices.
  - 1. Includes automatic controls for lighting including occupancy sensors.
- E. Section 262726 - Wiring Devices: Manual wall switches and wall dimmers.
- F. Section 265600 - Exterior Lighting.

**1.03 REFERENCE STANDARDS**

- A. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2019.
- B. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.
- C. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems; 2006.
- D. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2023.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- H. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
  - 2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
  - 3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
  - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

**1.05 SUBMITTALS**

- A. Shop Drawings:

- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

- 1. LED Luminaires:

- a. Include estimated useful life, calculated based on IES LM-80 test data.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

#### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting).
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

#### **1.08 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

#### **1.09 WARRANTY**

- A. Provide 3-year manufacturer warranty for LED luminaires, including drivers.
- B. Provide 10-year pro-rata warranty for batteries for self-powered exit signs.

### **PART 2 PRODUCTS**

#### **2.01 LUMINAIRE TYPES**

- A. Furnish products as indicated in luminaire schedule included on the drawings.

#### **2.02 LUMINAIRES**

- A. Manufacturers:

- 1. Acuity Brands, Inc: [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
- 2. Cooper Lighting, a division of Cooper Industries: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
- 3. Hubbell Lighting, Inc: [www.hubbellighting.com/#sle](http://www.hubbellighting.com/#sle).
- 4. Lutron Electronics Company, Inc: [www.lutron.com/#sle](http://www.lutron.com/#sle).

- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Recessed Luminaires:
  - 1. Ceiling Compatibility: Comply with NEMA LE 4.
- I. LED Luminaires:
  - 1. Components: UL 8750 recognized or listed as applicable.
  - 2. Tested in accordance with IES LM-79 and IES LM-80.
  - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

### **2.03 EXIT SIGNS**

- A. Description: Exit signs complying with NFPA 101 and applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single- or double-face as indicated or as required for installed location.
  - 2. Directional Arrows: As indicated or as required for installed location.
- B. Accessories:
  - 1. Provide compatible accessory wire guards where indicated.

### **2.04 BALLASTS AND DRIVERS**

- A. Manufacturers:
  - 1. Alloy LED: [www.alloyled.com/#sle](http://www.alloyled.com/#sle).
  - 2. General Electric Company/GE Lighting: [www.gelighting.com/#sle](http://www.gelighting.com/#sle).
  - 3. Lutron Electronics Company, Inc: [www.lutron.com/#sle](http://www.lutron.com/#sle).
  - 4. OSRAM Sylvania, Inc: [www.osram.us/ds/#sle](http://www.osram.us/ds/#sle).
  - 5. Philips Lighting North America Corporation: [www.usa.lighting.philips.com/#sle](http://www.usa.lighting.philips.com/#sle).
- B. Ballasts/Drivers - General Requirements:
  - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
  - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
- C. Dimmable LED Drivers:
  - 1. Dimming Range: Continuous dimming from 100 percent to one percent relative light output unless dimming capability to lower level is indicated, without flicker.
  - 2. Control Compatibility: Fully compatible with the dimming controls to be installed.

### **2.05 ACCESSORIES**

- A. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- B. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
- C. Architectural Trims for LED Lighting:
  - 1. Description: Trims designed for integration into architectural elements, with channels to accommodate LED tape lighting system.
  - 2. Profile: As indicated on drawings.
  - 3. Finish: As indicated on drawings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.03 INSTALLATION**

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.

- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
  - 1. Do not use ceiling tiles to bear weight of luminaires.
  - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
  - 3. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
- G. Recessed Luminaires:
  - 1. Install trims tight to mounting surface with no visible light leakage.
- H. Suspended Luminaires:
  - 1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  - 2. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet (1.2 m) between supports.
- I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- J. Install accessories furnished with each luminaire.
- K. Bond products and metal accessories to branch circuit equipment grounding conductor.
- L. Exit Signs:
  - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
  - 2. Install lock-on device on branch circuit breaker serving units.
- M. Remote Ballasts: Install in accessible location as indicated or as required to complete installation, using conductors per manufacturer's recommendations not exceeding manufacturer's recommended maximum conductor length to luminaire.

### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

### **3.05 ADJUSTING**

- A. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- B. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

### **3.06 CLEANING**

- A. Clean surfaces according to NECA 500 (commercial lighting) and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

### **3.07 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

**3.08 PROTECTION**

- A. Protect installed luminaires from subsequent construction operations.

**END OF SECTION**





**SECTION 265600  
EXTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior luminaires.
- B. Ballasts.
- C. Poles and accessories.
- D. Luminaire accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.

**1.03 REFERENCE STANDARDS**

- A. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2019.
- B. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).
- E. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.
- F. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2023.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
  - 2. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
  - 1. LED Luminaires:
    - a. Include estimated useful life, calculated based on IES LM-80 test data.
  - 2. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

**1.08 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 2-year manufacturer warranty for all LED luminaires, including drivers.

**PART 2 PRODUCTS**

**2.01 LUMINAIRE TYPES**

- A. Furnish products as indicated in luminaire schedule included on the drawings.

**2.02 LUMINAIRES**

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Recessed Luminaires:
  - 1. Ceiling Compatibility: Comply with NEMA LE 4.
  - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
  - 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
- H. LED Luminaires:
  - 1. Components: UL 8750 recognized or listed as applicable.
  - 2. Tested in accordance with IES LM-79 and IES LM-80.
  - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.
- I. Exposed Hardware: Stainless steel.

**2.03 BALLASTS AND DRIVERS**

- A. Manufacturers:
  - 1. California Accent Lighting, Inc; [www.calilighting.com/#sle](http://www.calilighting.com/#sle).
  - 2. General Electric Company/GE Lighting: [www.gelighting.com/#sle](http://www.gelighting.com/#sle).
  - 3. OSRAM Sylvania, Inc: [www.osram.us/ds/#sle](http://www.osram.us/ds/#sle).
  - 4. Philips Lighting North America Corporation; [www.usa.lighting.philips.com/#sle](http://www.usa.lighting.philips.com/#sle).
- B. Ballasts/Drivers - General Requirements:
  - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
  - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.
- C. Dimmable LED Drivers:
1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
  2. Control Compatibility: Fully compatible with the dimming controls to be installed.

## **2.04 POLES**

- A. Manufacturers:
1. Acuity Brands, Inc: [www.acuitybrands.com/#sle](http://www.acuitybrands.com/#sle).
  2. Cooper Lighting, a division of Cooper Industries: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  3. Hubbell Lighting, Inc: [www.hubbellighting.com/#sle](http://www.hubbellighting.com/#sle).
  4. Philips Lighting North America Corporation: [www.lightingproducts.philips.com/#sle](http://www.lightingproducts.philips.com/#sle).
  5. RAB Lighting, Inc: [www.rablighting.com/#sle](http://www.rablighting.com/#sle).
- B. All Poles:
1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
  2. Material: Aluminum, unless otherwise indicated.
  3. Shape: Square straight, unless otherwise indicated.
  4. Finish: Match luminaire finish, unless otherwise indicated.
  5. Mounting Height: 25-feet, unless otherwise indicated.
  6. Unless otherwise indicated, provide with the following features/accessories:
    - a. Top cap.
    - b. Handhole.
    - c. Anchor bolts with leveling nuts or leveling shims.
    - d. Anchor base cover.
- C. Metal Poles: Provide ground lug, accessible from handhole.

## **2.05 ACCESSORIES**

- A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.03 INSTALLATION**

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires in accordance with NECA/IESNA 501.

- E. Provide required support and attachment in accordance with Section 260529.
- F. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- G. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- H. Pole-Mounted Luminaires:
  - 1. Foundation-Mounted Poles:
    - a. Install foundations plumb.
    - b. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
    - c. Tighten anchor bolt nuts to manufacturer's recommended torque.
    - d. Install non-shrink grout between pole anchor base and concrete foundation, leaving small channel for condensation drainage.
    - e. Install anchor base covers or anchor bolt covers as indicated.
  - 2. Grounding:
    - a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
  - 3. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
- I. Install accessories furnished with each luminaire.
- J. Bond products and metal accessories to branch circuit equipment grounding conductor.
- K. Install lamps in each luminaire.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

#### **3.05 CLEANING**

- A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

#### **3.06 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

#### **3.07 PROTECTION**

- A. Protect installed luminaires from subsequent construction operations.

**END OF SECTION**

**SECTION 270529  
HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other communications work.

**1.02 RELATED REQUIREMENTS**

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 270533.13 - Conduit for Communications Systems: Additional support and attachment requirements for conduits.

**1.03 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; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. BICSI ITSIMM - Information Technology Systems Installation Methods Manual (ITSIMM), 8th Edition; 2022.
- E. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.
- F. MFMA-4 - Metal Framing Standards Publication; 2004.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).
- J. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
  - 2. Coordinate work to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
  - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for cable supports and channel/strut framing systems.

**1.06 QUALITY ASSURANCE**

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  - 1. Comply with the following. Where requirements differ, comply with most stringent.
    - a. TIA-569.
    - b. NFPA 70.
    - c. Requirements of authorities having jurisdiction.
  - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of communications work.
  - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
  - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
    - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit Supports: Straps and clamps suitable for conduit to be supported.
  - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
  - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Noncontinuous Cable Supports: Suitable for cables to be supported, including but not limited to J-hooks, bridle rings, drive rings, and flexible harnesses/slings.
  - 1. Cable Supports Installed in Spaces Used for Environmental Air: Plenum rated; listed and labeled as complying with UL 2043, suitable for use in air-handling spaces.
  - 2. J-Hooks: Noncontinuous cabling support with removable top retainer clip.
    - a. Material: Use galvanized steel or factory-painted steel.
    - b. Provide support surfaces with smooth, beveled edges and radius not less than minimum allowable bend radius of cables supported.
    - c. Provide multitiered J-hooks where required to support multiple cabling systems.
  - 3. Bridle Rings: Noncontinuous circular cabling support.
    - a. Material: Use galvanized steel or painted steel.
    - b. Provide integral saddle with smooth, beveled edges and radius not less than minimum allowable bend radius of cables supported where indicated.
- D. Cable Routing Assemblies:
  - 1. Applications:
    - a. Horizontal Supports: Do not exceed 3 feet (0.9 m) and at each end or joint.
    - b. Vertical Supports: Do not exceed 4 feet (1.2 m), unless listed otherwise - maximum one joint between supports.
    - c. Comply with NFPA 70 for cable routing assemblies.
    - d. Provide NFPA 70 required bonding of metal components in accordance with manufacturer written instructions.
    - e. Allowable Cable Types: Category 3, Category 5e, and Category 6.
- E. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
  - 1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).

- F. Metal Channel/Strut Framing Systems:
  - 1. Manufacturers:
    - a. ABB: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Atkore International Inc; Unistrut: [www.unistrut.us/#sle](http://www.unistrut.us/#sle).
    - c. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
  - 2. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
  - 3. Comply with MFMA-4.
- G. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
  - 1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2-inch (13 mm) diameter.
    - b. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch (6 mm) diameter.
    - c. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch (10 mm) diameter.
    - d. Trapeze Support for Multiple Conduits: 3/8-inch (10 mm) diameter.
    - e. Outlet Boxes: 1/4-inch (6 mm) diameter.
- H. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
  - 1. Manufacturers:
    - a. Atkore International Inc; Unistrut: [www.unistrut.us/#sle](http://www.unistrut.us/#sle).
    - b. Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. PHP Systems/Design: [www.phpsd.com/#sle](http://www.phpsd.com/#sle).
  - 2. Description: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring attachment to roof structure and not penetrating roofing assembly, with support fixtures as specified.
  - 3. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  - 4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
  - 5. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.
- I. Anchors and Fasteners:
  - 1. Manufacturers - Mechanical Anchors:
    - a. Dewalt: [anchors.dewalt.com/#sle](http://anchors.dewalt.com/#sle).
    - b. Hilti, Inc: [www.hilti.com/#sle](http://www.hilti.com/#sle).
    - c. ITW Red Head, a division of Illinois Tool Works, Inc: [www.itwredhead.com/#sle](http://www.itwredhead.com/#sle).
    - d. Simpson Strong-Tie Company Inc: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
  - 2. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
  - 3. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  - 4. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  - 5. Hollow Masonry: Use toggle bolts.
  - 6. Hollow Stud Walls: Use toggle bolts.
  - 7. Steel: Use beam clamps, machine bolts, or welded threaded studs.
  - 8. Sheet Metal: Use sheet metal screws.
  - 9. Wood: Use wood screws.
  - 10. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    - a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
    - b. Comply with MFMA-4.
    - c. Channel Material: Use galvanized steel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.



- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1, BICSI ITSIMM, and BICSI N1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- 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 in accordance with manufacturer's recommended torque settings.
- J. Remove temporary supports.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**

**SECTION 270533.13**  
**CONDUIT FOR COMMUNICATIONS SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel electrical metallic tubing (EMT).
- C. Rigid polyvinyl chloride (PVC) conduit.
- D. Electrical nonmetallic tubing (ENT).
- E. Reinforced thermosetting resin conduit (RTRC).
- F. High-density polyethylene (HDPE) conduit.
- G. Inside-plant flexible nonmetallic communications raceway/innerduct.

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 270529 - Hangers and Supports for Communications Systems.

**1.03 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A); 2020.
- D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2018.
- E. ASTM F2160 - Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD); 2016.
- F. ASTM F2176 - Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct; 2017.
- G. BICSI ITSIMM - Information Technology Systems Installation Methods Manual (ITSIMM), 8th Edition; 2022.
- H. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.
- I. BICSI TDMM - Telecommunications Distribution Methods Manual, 14th Edition; 2020.
- J. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- K. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- L. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2017.
- M. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- N. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- O. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- P. NEMA TC 6&8 - Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installations; 2020.
- Q. NEMA TC 7 - Solid-Wall Coilable and Straight Electrical Polyethylene Conduit; 2021.
- R. NEMA TC 13 - Electrical Nonmetallic Tubing (ENT); 2014 (Reaffirmed 2019).
- S. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series; 2015.

- T. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. TIA-568.0 - Generic Telecommunications Cabling for Customer Premises; 2020e.
- V. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).
- W. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- X. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- Y. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- Z. UL 651A - Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit; Current Edition, Including All Revisions.
- AA. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- BB. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- CC. UL 1653 - Electrical Nonmetallic Tubing; Current Edition, Including All Revisions.
- DD. UL 2024 - Standard for Cable Routing Assemblies and Communications Raceways; Current Edition, Including All Revisions.
- EE. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate minimum sizes of conduits with actual type and quantity of cables to be installed.
  - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts.
  - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
  - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not begin installation of communications cables until installation of conduit between termination points is complete.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

#### **1.06 QUALITY ASSURANCE**

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, TIA-569, BICSI ITSIMM, BICSI TDMM, manufacturers' instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use

galvanized steel rigid metal conduit.

- C. Underground:
  - 1. Under Slab on Grade: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
  - 2. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, reinforced thermosetting resin conduit (RTRC), or high-density polyethylene (HDPE) conduit.
  - 3. Where rigid polyvinyl chloride (PVC) conduit or high-density polyethylene (HDPE) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), galvanized steel electrical metallic tubing (EMT), or schedule 80 rigid PVC conduit where emerging from underground.
  - 4. Where rigid polyvinyl chloride (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows or concrete-encased PVC elbows for bends.
  - 5. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth, use field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
  - 6. Where galvanized steel electrical metallic tubing (EMT) is installed in direct contact with earth, use field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
- D. Embedded Within Concrete:
  - 1. Within Slab on Grade: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC). Embed within structural slabs only where approved by Structural Engineer.
  - 2. Within Slab Above Ground: Use galvanized steel rigid metal conduit (RMC), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC). Embed within structural slabs only where approved by Structural Engineer.
  - 3. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) where emerging from concrete.
- E. Concealed Within Masonry Walls: Use galvanized steel electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel electrical metallic tubing (EMT) or inside-plant flexible nonmetallic communications raceway/innerduct.
- H. Interior, Damp or Wet Locations: Use galvanized steel electrical metallic tubing (EMT).
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC).
  - 1. Locations subject to physical damage include, but are not limited to:
    - a. Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.
- K. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).

## **2.02 CONDUIT - GENERAL REQUIREMENTS**

- A. Comply with NFPA 70 and TIA-569.
- B. Provide conduit, fittings, supports, and accessories required for complete communications pathway.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.

- D. Where conduit size is not indicated, size to comply with NFPA 70, TIA-569, and BICSI TDMM, but not less than applicable minimum size requirements specified. Where specified standards differ, comply with most stringent.

### **2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)**

- A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
  2. Nucor Tubular Products: [www.nucortubular.com/#sle](http://www.nucortubular.com/#sle).
  3. Western Tube, a division of Zekelman Industries: [www.westerntube.com/#sle](http://www.westerntube.com/#sle).
  4. Wheatland Tube, a division of Zekelman Industries: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
    - c. Bridgeport Fittings Inc: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - d. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
  3. Material: Use steel or malleable iron.
  4. Connectors and Couplings: Use threaded fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.
  5. Conduit Bodies: Use only conduit bodies specifically designed for communications cabling. Standard conduit bodies designed for electrical raceways are not permitted.
    - a. Manufacturers:
      - 1) Madison Electric Products, a division of Southwire Company: [www.meproducts.net/#sle](http://www.meproducts.net/#sle).
    - b. Comply with TIA-568.0 minimum bend radius requirements for fiber optic cables.

### **2.04 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)**

- A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
  2. Nucor Tubular Products: [www.nucortubular.com/#sle](http://www.nucortubular.com/#sle).
  3. Western Tube, a division of Zekelman Industries: [www.westerntube.com/#sle](http://www.westerntube.com/#sle).
  4. Wheatland Tube, a division of Zekelman Industries: [www.wheatland.com/#sle](http://www.wheatland.com/#sle).
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
1. Manufacturers:
    - a. ABB; T&B: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
    - b. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
    - c. Bridgeport Fittings, LLC: [www.bptfittings.com/#sle](http://www.bptfittings.com/#sle).
    - d. Emerson Electric Co; O-Z/Gedney: [www.emerson.com/#sle](http://www.emerson.com/#sle).
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel or malleable iron.
  4. Connectors and Couplings: Use compression/gland or set-screw type.
    - a. Do not use indenter type connectors and couplings.
  5. Conduit Bodies: Use only conduit bodies specifically designed for communications cabling. Standard conduit bodies designed for electrical raceways are not permitted.
    - a. Manufacturers:
      - 1) Madison Electric Products, a division of Southwire Company: [www.meproducts.net/#sle](http://www.meproducts.net/#sle).

- b. Comply with TIA-568.0 minimum bend radius requirements for fiber optic cables.

## **2.05 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT**

- A. Manufacturers:
  - 1. ABB; Carlon: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. Allied Tube & Conduit, a division of Atkore International: [www.alliedeg.us/#sle](http://www.alliedeg.us/#sle).
  - 3. Cantex Inc: [www.cantexinc.com/#sle](http://www.cantexinc.com/#sle).
  - 4. Heritage Plastics, a division of Atkore International: [www.heritageplastics.com/#sle](http://www.heritageplastics.com/#sle).
  - 5. JM Eagle: [www.jmeagle.com/#sle](http://www.jmeagle.com/#sle).
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage.
- C. Fittings:
  - 1. Manufacturer: Same as manufacturer of conduit to be connected.
  - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.
  - 3. Conduit Bodies: Use only conduit bodies specifically designed for communications cabling. Standard conduit bodies designed for electrical raceways are not permitted.
    - a. Manufacturers:
      - 1) Madison Electric Products, a division of Southwire Company: [www.meproducts.net/#sle](http://www.meproducts.net/#sle).
    - b. Comply with TIA-568.0 minimum bend radius requirements for fiber optic cables.

## **2.06 ELECTRICAL NONMETALLIC TUBING (ENT)**

- A. Manufacturers:
  - 1. ABB; Carlon: [www.electrification.us.abb.com/#sle](http://www.electrification.us.abb.com/#sle).
  - 2. IPEX, a division of Aliaxis: [www.ipexna.com/#sle](http://www.ipexna.com/#sle).
- B. Description: NFPA 70, Type ENT electrical nonmetallic tubing complying with NEMA TC 13 and listed and labeled as complying with UL 1653.
- C. Fittings:
  - 1. Manufacturer: Same as manufacturer of ENT to be connected.
  - 2. Use solvent-welded type fittings.
  - 3. Solvent-Welded Fittings: Rigid PVC fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; suitable for use with ENT.

## **2.07 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)**

- A. Manufacturers:
  - 1. Champion Fiberglass, Inc: [www.championfiberglass.com/#sle](http://www.championfiberglass.com/#sle).
  - 2. FRE Composites, a division of Atkore International: [www.frecompositesinc.com/#sle](http://www.frecompositesinc.com/#sle).
  - 3. United Fiberglass of America, Inc: [www.unitedfiberglass.com/#sle](http://www.unitedfiberglass.com/#sle).
- B. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).
- C. Supports: As recommended by manufacturer.
- D. Fittings: Same type and manufacturer as conduit to be connected.
  - 1. Conduit Bodies: Standard conduit bodies designed for electrical raceways are not permitted.

## **2.08 HIGH-DENSITY POLYETHYLENE (HDPE) CONDUIT**

- A. Description: NFPA 70, Type HDPE high-density polyethylene solid-wall conduit complying with ASTM F2160 and NEMA TC 7; list and label as complying with UL 651A; Schedule 40 unless otherwise indicated.
- B. Joining Methods: Approved by HDPE conduit manufacturer.
- C. Mechanical Fittings: Comply with ASTM F2176; list and label as complying with UL 651A.

## **2.09 INSIDE-PLANT FLEXIBLE NONMETALLIC COMMUNICATIONS RACEWAY/INNERDUCT**

- A. Description: Flexible, corrugated, nonmetallic communications raceway and associated fittings listed and labeled as complying with UL 2024; also suitable for installation as innerduct.
- B. Use only with approved cables in accordance with listing.

## **2.10 ACCESSORIES**

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- C. Epoxy Adhesive for RTRC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1, BICSI ITSIMM, and BICSI N1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Galvanized Steel Electrical Metallic Tubing (EMT): Install in accordance with NECA 101.
- E. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.
- F. Electrical Nonmetallic Tubing (ENT): Install in accordance with NECA 111.
- G. Conduit Routing:
  - 1. When conduit destination is indicated without specific routing, determine exact routing required.
  - 2. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
  - 3. Arrange conduit to maintain adequate headroom, clearances, and access.
  - 4. Arrange conduit to provide minimum bend radii in accordance with BICSI TDMM.
  - 5. Route conduits above water and drain piping where possible.
  - 6. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
  - 7. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
    - a. Hot water piping.
- H. Conduit Support:
  - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction.
  - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- I. Connections and Terminations:
  - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

3. Use suitable adapters where required to transition from one type of conduit to another.
  4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  5. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect cables.
  6. Secure joints and connections to provide mechanical strength and electrical continuity.
- J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  2. Make penetrations perpendicular to surfaces unless otherwise indicated.
  3. Provide sleeves and/or slots for penetrations as indicated or as required to facilitate installation.
  4. Conceal bends for conduit risers emerging above ground.
  5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
  7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 078400.
- K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed cables or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
  3. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
  4. Where conduits are subject to earth movement by settlement or frost.
- L. Provide grounding and bonding.

### **3.03 FIELD QUALITY CONTROL**

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Correct deficiencies and replace damaged or defective conduits.

### **3.04 CLEANING**

- A. Clean interior of conduits to remove moisture and foreign matter.

### **3.05 PROTECTION**

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of cables.

**END OF SECTION**





**SECTION 275116  
PUBLIC ADDRESS SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Amplifier and control equipment.
- B. Input equipment.
- C. Reproducer equipment.
- D. Sound system cable.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260533.16 - Boxes for Electrical Systems.

**1.03 REFERENCE STANDARDS**

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

**1.04 SYSTEM DESCRIPTION**

- A. Public address system for voice and music.
- B. Input components:
  - 1. Compact disc player.
  - 2. AM/FM tuner.
  - 3. Microphone.
- C. Features:
  - 1. Interface to telephone system.
  - 2. One-way paging by zone.
  - 3. Emergency paging override.
  - 4. Distribution of background music.

**1.05 SUBMITTALS**

- A. Shop Drawings: Indicate electrical characteristics and connection requirements. Indicate layout of equipment mounted in racks and cabinets, component interconnecting wiring, and wiring diagrams of field wiring to speakers and remote input devices.
- B. Operation Data: Include instructions for adjusting, operating, and extending the system.
- C. Maintenance Data: Include repair procedures and spare parts documentation.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70 and Federal Communications Commission.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience with service facilities within 100 miles of Project.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Bogen Communications, Inc: [www.bogen.com/#sle](http://www.bogen.com/#sle).
- B. Toa Electronics, Inc: [www.toaelectronics.com/#sle](http://www.toaelectronics.com/#sle).

**2.02 AMPLIFICATION AND CONTROL EQUIPMENT**

- A. Microphone Inputs: Two low impedance inputs with 600 microvolt sensitivity and noise level at least 55 dB below rated output.
- B. System Frequency Response: 50 to 15,000 Hz, plus or minus 2 dB.

- C. System Distortion: Less than 1.5 percent, 100 to 100,000 Hz at rated power.
- D. System Output: 4 ohms 25 volts.
- E. Volume Controls: One for each input and one master volume.
- F. Bass Control: Plus 8 dB to minus 12 dB at 50 Hz.
- G. Treble Control: Plus 8 dB to minus 12 dB at 10,000 Hz.
- H. Program Selector: Provide program, listen-talk, and mode selector switches.
- I. System Cabinet: Rack mounted.

### 2.03 COMPONENTS

- A. Compact Disc Player: 6-disc system.
- B. AM/FM Tuner: Tuner with 525 to 1605 kHz AM and 88 to 108 MHz FM tuning range.
  - 1. AM Performance:
    - a. AM IF Rejection: Over 30 dB.
    - b. AM Selectivity: 7 kHz at minus 6 dB.
    - c. AM Fidelity: 100 to 4500 Hz, plus or minus 3 dB.
    - d. AM Antenna Input: 75 ohms, unbalanced.
  - 2. FM Performance:
    - a. FM IF Rejection: Over 50 dB.
    - b. FM Antenna Input: 300 ohms, balanced.
- C. Microphone: Desk type low impedance microphone with push-to-talk switch.
- D. Speakers: 8 inch (200 mm) coaxial speaker with integral crossover circuit.
  - 1. Power Rating: 20 watts.
  - 2. Frequency Range: 45 to 18,000 Hz.
  - 3. Sound Pressure Level: 95 dB at 3 feet (0.9 M) with 1 watt input.
  - 4. Magnet: Ceramic; 10 ounces (283 g) low frequency unit; 3 ounces (85 g) high frequency unit.
  - 5. Dispersion: Minus 3 dB at 90 degrees, minus 5 dB at 110 degrees.
- E. Speaker Baffles and Enclosure: Square, molded plastic, with uniform perforations.
  - 1. Size: 12 inch (305 mm).
  - 2. Finish: White.
  - 3. Speaker Backbox: Insulated with sound-deadening material.
- F. Matching Transformers: Tapped from 0.5 to 4 watts in 1 watt steps, with primary/secondary ratio to match amplifier to speaker impedances.
- G. Volume Pads: Transformer type rated 10 watts.
- H. Telephone Interface: 600 ohm - auxiliary input.
- I. Equipment Rack: Floor mounted equipment rack.
  - 1. Equipment Mounting Width: 19 inch (483 mm).
  - 2. Finish: Gray enamel finish.
  - 3. Include front hinged and latched door.
  - 4. Include six receptacle multioutlet assembly inside rack.
- J. Antenna: Folded dipole FM antenna.
  - 1. Impedance: 300 ohm with matching transformer for 75 ohm coaxial cable.
  - 2. Construction: Use tubular metal elements.
  - 3. Wind Resistance: Withstand 100 miles per hour (161 kph) wind.

### 2.04 WIRE AND CABLE

- A. Microphone Cord: 20 AWG stranded copper conductor, 600 volt insulation, rated 60 degrees C, two conductor shielded cable with rubber jacket.
- B. Input Cable: 22 AWG copper conductor, 300 volt insulation, rated 60 degrees C, paired conductors twisted together, shielded, and covered with a PVC jacket.

- C. Speaker Wire and Cable: 22 AWG copper conductor, 300 volt insulation, rated 60 degrees C, paired conductors twisted together shielded and covered with a PVC jacket.
- D. Plenum Cable for Speaker Circuits: 22 AWG copper conductor, 300 volt insulation, rated 200 degrees C, paired conductors twisted together shielded and covered with a nonmetallic jacket; suitable for use for Class 2 circuits in air handling ducts, hollow spaces used as ducts, and plenums.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Splice cable only in accessible junction boxes or at terminal block units.
- C. Make cable shields continuous at splices and connect speaker circuit shield to equipment ground only at amplifier.
- D. Install input circuits in separate cables and raceways from output circuits.
- E. Leave 18 inches (300 mm) excess cable at each termination at microphone, volume pad, speaker, and other system outlet.
- F. Leave 6 feet (2 m) excess cable at each termination at system cabinet
- G. Provide protection for exposed cables where subject to damage.
- H. Support cables above accessible ceilings to keep them from resting on ceiling tiles. Use spring metal clips or plastic cable ties to support cables from structure for ceiling suspension system. Include bridle rings or drive rings.
- I. Use suitable cable fittings and connectors.
- J. Connect reproducers to amplifier with matching transformers.
- K. Ground and bond equipment and circuits in accordance with Section 260526.

#### **3.02 FIELD QUALITY CONTROL**

- A. Provide the services of manufacturer's technical representative to prepare and start system.
  - 1. Include making of final wiring connections, inspection and adjusting of completed installation, and systems demonstration.
  - 2. Certify that installation is complete and performs according to specified requirements.
- B. Measure and record sound power levels at designated locations.

#### **3.03 ADJUSTING**

- A. Adjust transformer taps for appropriate sound level.
- B. Adjust devices and wall plates to be flush and level.

#### **3.04 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate operation of system to Owner's personnel.
  - 1. Use operation and maintenance data as reference during demonstration.
  - 2. Briefly describe function, operation, and maintenance of each component.

#### **3.05 MAINTENANCE**

- A. Provide a separate maintenance contract for specified maintenance service.
- B. Provide service and maintenance of public address and music system for one year from Date of Substantial Completion.

**END OF SECTION**



**SECTION 281000  
ACCESS CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Access control system requirements.
- B. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 DEFINITIONS**

- A. Access Control Cloud Services: Subscription-based hosted application utilizing Software as a Service (SaaS) delivery model in lieu of on-premises servers/software.

**1.04 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 294 - Access Control System Units; Current Edition, Including All Revisions.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate the work with other installers to provide power for equipment at required locations.
  - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.06 SUBMITTALS**

- A. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
- B. Evidence of qualifications for installer.

**1.07 QUALITY ASSURANCE**

- A. Comply with the following:
  - 1. NFPA 70.
  - 2. The requirements of the local authorities having jurisdiction.
  - 3. Applicable TIA/EIA standards.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

**1.09 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

### 1.10 WARRANTY

- A. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Access Control Units:
  - 1. Honeywell International, Inc: [www.honeywellaccess.com/#sle](http://www.honeywellaccess.com/#sle).
  - 2. Schneider Electric; EcoStruxure Access Expert: [www.se.com/#sle](http://www.se.com/#sle).
  - 3. Avigilon: [www.get.avigilon.com/#sle](http://www.get.avigilon.com/#sle).
- B. Access Control Software:
  - 1. Honeywell International, Inc: [www.honeywellaccess.com/#sle](http://www.honeywellaccess.com/#sle).
  - 2. Schneider Electric; EcoStruxure Security Expert: [www.se.com/#sle](http://www.se.com/#sle).
  - 3. Avigilon: [www.get.avigilon.com/#sle](http://www.get.avigilon.com/#sle).
- C. Readers and Keypads:
  - 1. Honeywell International, Inc: [www.honeywellaccess.com/#sle](http://www.honeywellaccess.com/#sle).
  - 2. Schneider Electric; EcoStruxure Access Expert: [www.se.com/#sle](http://www.se.com/#sle).
  - 3. Avigilon: [www.get.avigilon.com/#sle](http://www.get.avigilon.com/#sle).

### 2.02 ACCESS CONTROL SYSTEM REQUIREMENTS

- A. Provide new access control system consisting of required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. System Battery Backup: Provide batteries/uninterruptible power supplies (UPS) as required for 90 minutes full operation.
- C. Surge Protection:
  - 1. Provide surge protection for readers and door strikes/locks.
- D. Access Control Points:
  - 1. See article "ACCESS CONTROL POINT PERIPHERALS" below for device descriptions.
- E. Computers Required:
  - 1. See article "ACCESS CONTROL UNITS AND SOFTWARE" below for product descriptions.
  - 2. Server(s):
    - a. Quantity: One.
    - b. Location(s): To be determined.
    - c. Peripherals required for each server:
      - 1) Mouse and keyboard.
      - 2) Monitor(s): One.
      - 3) Speakers (where not integral with monitor).
  - 3. Workstation Computer(s):
    - a. Quantity: One.
    - b. Location(s): To be determined.
    - c. Peripherals required for each workstation computer:
      - 1) Mouse and keyboard.
      - 2) Monitor(s): One.
      - 3) Speakers (where not integral with monitor).
      - 4) Alarm/report printer.
- F. Interface with Other Systems:
  - 1. Provide products compatible with other systems requiring interface with access control system.
  - 2. Interface with fire alarm system as specified in Section 284600.

- a. Capable of affecting access for designated doors for selected fire alarm system events.
- G. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - 1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

### **2.03 ACCESS CONTROL UNITS AND SOFTWARE**

- A. Provide access control units and software compatible with readers to be connected.
- B. Unless otherwise indicated, provide software and licenses required for fully operational system.

### **2.04 ACCESS CONTROL POINT PERIPHERALS**

- A. Provide devices compatible with control units and software.
- B. Provide devices suitable for operation under the service conditions at the installed location.
- C. Door Locking Devices (Electric Strikes and Magnetic Locks): Comply with Section 087100.

### **2.05 ACCESSORIES**

- A. Provide components as indicated or as required for connection of access control system to devices and other systems indicated.
- B. Unless otherwise indicated, credentials to be provided by Contractor.
  - 1. Provide credentials compatible with readers and control units/software to be used.
- C. Provide cables as indicated or as required for connections between system components.
- D. Provide accessory racks/cabinets as indicated or as required for equipment mounting.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install access control system in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Provide grounding and bonding in accordance with Section 260526.
- D. Identify system wiring and components in accordance with Section 260553.

### **3.03 FIELD QUALITY CONTROL**

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Program system parameters according to requirements of Owner.
- C. Test for proper interface with other systems.
- D. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

### **3.04 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

### **3.05 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.



**3.06 PROTECTION**

- A. Protect installed system components from subsequent construction operations.

**3.07 MAINTENANCE**

- A. Provide trouble call-back service upon notification by Owner:
  - 1. Include allowance for call-back service during normal working hours at no extra cost to Owner.
  - 2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

**END OF SECTION**

**SECTION 282000  
VIDEO SURVEILLANCE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Video surveillance system requirements.
- B. Video recording and viewing equipment.
- C. Cameras.
- D. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260533.13 - Conduit for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 281000 - Access Control: For interface with video surveillance system.
- F. Section 283111 - Building Intrusion Detection: For interface with video surveillance system.

**1.03 REFERENCE STANDARDS**

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. IEEE 802.3 - IEEE Standard for Ethernet; 2022, with Amendment (2024).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 303 - Standard for Installing and Maintaining Closed-Circuit Television (CCTV) Systems; 2019.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of cameras with structural members, ductwork, piping, equipment, luminaires, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
  - 2. Coordinate the work with other installers to provide power for cameras and equipment at required locations.
  - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Preinstallation Meetings:
  - 1. Conduct meeting with facility representative to review camera and equipment locations and camera field of view objectives.

**1.05 SUBMITTALS**

- A. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
- B. Design Data:
  - 1. Standby battery/UPS calculations.
  - 2. Video storage capacity calculations.
- C. Certify that proposed system design and components meet or exceed specified requirements.
- D. Evidence of qualifications for installer.

- E. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.
- F. Maintenance contracts.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with the following:
  - 1. NFPA 70.
  - 2. Applicable TIA/EIA standards.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions and NECA 303.
- B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

#### **1.08 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

#### **1.09 WARRANTY**

- A. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Video Recording and Viewing Equipment:
  - 1. Bosch Security Systems: [www.boschsecurity.us/#sle](http://www.boschsecurity.us/#sle).
  - 2. Honeywell International, Inc: [www.honeywellvideo.com/#sle](http://www.honeywellvideo.com/#sle).
  - 3. Pelco, a brand of Schneider Electric: [www.pelco.com/#sle](http://www.pelco.com/#sle).
  - 4. VIVOTEK: [www.vivotek.com/#sle](http://www.vivotek.com/#sle).
  - 5. Avigilon: [www.avigilon.com/#sle](http://www.avigilon.com/#sle).
- B. Cameras:
  - 1. Axis Communications: [www.axis.com/#sle](http://www.axis.com/#sle).
  - 2. Bosch Security Systems: [www.boschsecurity.us/#sle](http://www.boschsecurity.us/#sle).
  - 3. Honeywell International, Inc: [www.honeywellvideo.com/#sle](http://www.honeywellvideo.com/#sle).
  - 4. Pelco, a brand of Schneider Electric: [www.pelco.com/#sle](http://www.pelco.com/#sle).
  - 5. VIVOTEK: [www.vivotek.com/#sle](http://www.vivotek.com/#sle).
  - 6. Avigilon: [www.Avigilon.com/#sle](http://www.Avigilon.com/#sle).

#### **2.02 VIDEO SURVEILLANCE SYSTEM**

- A. Provide new video surveillance system consisting of all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. System Description: IP system with connection to network (IP) cameras.
  - 1. Video Storage Capacity: Suitable for storing video from all cameras for 15 days.
  - 2. System Battery Backup: Provide batteries/uninterruptible power supplies (UPS) as required for 90 minutes full operation.
  - 3. Surge Protection:
    - a. Provide surge protection for exterior cameras.
- C. Cameras Required:
  - 1. See article "CAMERAS" below for product descriptions.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.

- E. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class B, consumer application.

### **2.03 VIDEO RECORDING AND VIEWING EQUIPMENT**

- A. Provide video recording and viewing equipment compatible with cameras to be connected.
- B. Network Video Recorders (NVRs):
  - 1. Supports connection of network (IP) cameras.
  - 2. Supports continuous and event-based recording.
  - 3. Network Video Recorder:
    - a. Capacity: 15-Days.
    - b. Recording and Viewing Performance: 15 fps at 1080p resolution.
    - c. Storage Capacity: 30 TB.
    - d. Removable Media: DVD-RW, USB.
    - e. Network: Single 1 Gigabit Ethernet.
    - f. Features:
      - 1) Supports PTZ camera control.
      - 2) Supports remote access via desktop and mobile device.
- C. Software:
  - 1. Unless otherwise indicated, provide all software and licenses required for fully operational system.

### **2.04 CAMERAS**

- A. Provide cameras and associated accessories suitable for operation under the service conditions at the installed location. Provide additional components (e.g. enclosures, heaters, blowers, etc.) as required.
- B. Where not factory-installed, provide additional components (e.g. lenses, mounting accessories, etc.) as necessary for complete installation.
- C. Network (IP) Cameras:
  - 1. Signal-to-Noise Ratio: Not less than 50 dB.
  - 2. Provide the following standard features:
    - a. Automatic electronic shutter.
    - b. Automatic gain control.
    - c. Automatic white balance.
    - d. Web-based interface for remote viewing and setup.
    - e. Password protected security access.
  - 3. Network (IP) Outdoor PTZ (Pan/Tilt/Zoom) Camera Indoor Fixed Dome Camera:
    - a. Camera Type: True day/night with IR cut filter.
    - b. Image Sensor: 1/4 inch CMOS.
    - c. Resolution: Up to 720p (1280 x 720).
    - d. Frame Rate: Up to 30 frames per second (fps) at all available resolutions.
    - e. Video Streaming: Supports two simultaneous video streams using H.264 and H.264/MJPEG compression .
    - f. Power: Power over Ethernet IEEE 802.3 or 24 VAC as indicated or as required.
    - g. Features:
      - 1) Supports alarm input/output.
      - 2) Supports bidirectional audio.
      - 3) Camera tampering detection.
      - 4) Video motion detection capability.

### **2.05 ACCESSORIES**

- A. Camera Mounting Supports: Where not factory installed, provide mounting supports necessary for installation.
  - 1. Products:
    - a. StrongPoles, LLC; Surface Mount Pole: [www.strongpoles.com/#sle](http://www.strongpoles.com/#sle).

- B. Provide components as indicated or as required for connection of video surveillance system to devices and other systems indicated.
- C. Provide components as indicated or as required for system power and network connections.
- D. Provide cables as indicated or as required for connections between system components.
- E. Provide accessory racks/cabinets as indicated or as required for equipment mounting.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system where applicable.
- E. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install video surveillance system in accordance with NECA 1 (general workmanship) and NECA 303.
- B. Install products in accordance with manufacturer's instructions.
- C. Provide required support and attachment in accordance with Section 260529.
- D. Provide grounding and bonding in accordance with Section 260526.
- E. Identify system wiring and components in accordance with Section 260553.

#### **3.03 FIELD QUALITY CONTROL**

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Adjust cameras to provide desired field of view and produce suitable images under all service lighting conditions.
- C. Program system parameters according to requirements of Owner.
- D. Test for proper interface with other systems.
- E. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

#### **3.04 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

#### **3.05 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- B. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Location: At project site.

#### **3.06 PROTECTION**

- A. Protect installed system components from subsequent construction operations.

#### **3.07 MAINTENANCE**

- A. Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of video surveillance system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic

examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

- B. Provide trouble call-back service upon notification by Owner:
1. Include allowance for call-back service during normal working hours at no extra cost to Owner.
  2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

**END OF SECTION**



**SECTION 284600  
FIRE DETECTION AND ALARM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire alarm system design and installation, including all components, wiring, and conduit.
- B. Transmitters for communication with supervising station.
- C. Maintenance of fire alarm system under contract for specified warranty period.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

**1.03 SUBMITTALS**

- A. Proposal Documents: Submit the following with cost/time proposal:
  - 1. NFPA 72 "Record of Completion", filled out to the extent known at the time.
  - 2. Manufacturer's detailed data sheet for each control unit, initiating device, and notification appliance.
  - 3. Certification by Contractor that the system design will comply with Contract Documents.
  - 4. Proposed maintenance contract.
- B. Drawings must be prepared as DXF-format CAD drawings.
  - 1. Owner will provide floor plan drawings for Contractor's use; verify all dimensions on Owner-provided drawings.
- C. Evidence of designer qualifications.
- D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
  - 1. Copy (if any) of list of data required by authority having jurisdiction.
  - 2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
  - 3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
  - 4. System zone boundaries and interfaces to fire safety systems.
  - 5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
  - 6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
  - 7. List of all devices on each signaling line circuit, with spare capacity indicated.
  - 8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
  - 9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
  - 10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
  - 11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.



- 12. Certification by Contractor that the system design complies with Contract Documents.
- E. Evidence of installer qualifications.
- F. Evidence of instructor qualifications; training lesson plan outline.
- G. Evidence of maintenance contractor qualifications, if different from installer.
- H. Inspection and Test Reports:
  - 1. Submit inspection and test plan prior to closeout demonstration.
  - 2. Submit documentation of satisfactory inspections and tests.
  - 3. Submit NFPA 72 "Inspection and Test Form," filled out.
- I. Operating and Maintenance Data: See Section 017800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
  - 1. Complete set of specified design documents, as approved by authority having jurisdiction.
  - 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
  - 3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
  - 4. List of recommended spare parts, tools, and instruments for testing.
  - 5. Replacement parts list with current prices, and source of supply.
  - 6. Detailed troubleshooting guide and large scale input/output matrix.
  - 7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
  - 8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.
- J. Project Record Documents: See Section 017800 for additional requirements; have one set available during closeout demonstration:
  - 1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
  - 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
  - 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- K. Closeout Documents:
  - 1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
  - 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

#### **1.04 QUALITY ASSURANCE**

- A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.
- B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
  - 1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
  - 2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
  - 3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
- C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.

- D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

#### **1.05 WARRANTY**

- A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.
- B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Fire Alarm Control Units and Accessories:
1. Honeywell Security & Fire Solutions/Gamewell-FCI: [www.gamewell-fci.com/#sle](http://www.gamewell-fci.com/#sle).
  2. Honeywell Security & Fire Solutions/Fire-Lite: [www.firelite.com/#sle](http://www.firelite.com/#sle).
  3. Honeywell Security & Fire Solutions/Notifier: [www.notifier.com/#sle](http://www.notifier.com/#sle).
  4. Honeywell Security & Fire Solutions/Silent Knight: [www.silentknight.com/#sle](http://www.silentknight.com/#sle).
  5. Honeywell Security & Fire Solutions/Vista: [www.security.honeywell.com/#sle](http://www.security.honeywell.com/#sle).
  6. Siemens Building Technologies, Inc: [www.usa.siemens.com/#sle](http://www.usa.siemens.com/#sle).
  7. Simplex, a brand of Johnson Controls: [www.simplex-fire.com/#sle](http://www.simplex-fire.com/#sle).
  8. Edwards Fire Systems, a brand of Carrier: [www.edwardsfiresafety.com/#sle](http://www.edwardsfiresafety.com/#sle).
  9. Provide control units made by the same manufacturer.
- B. Initiating Devices and Notification Appliances:
1. Honeywell Security & Fire Solutions/Gamewell-FCI: [www.gamewell-fci.com/#sle](http://www.gamewell-fci.com/#sle).
  2. Honeywell Security & Fire Solutions/Fire-Lite: [www.firelite.com/#sle](http://www.firelite.com/#sle).
  3. Honeywell Security & Fire Solutions/Notifier: [www.notifier.com/#sle](http://www.notifier.com/#sle).
  4. Honeywell Security & Fire Solutions/Silent Knight: [www.silentknight.com/#sle](http://www.silentknight.com/#sle).
  5. Honeywell Security & Fire Solutions/Vista: [www.security.honeywell.com/#sle](http://www.security.honeywell.com/#sle).
  6. Siemens Building Technologies, Inc: [www.sbt.siemens.com/#sle](http://www.sbt.siemens.com/#sle).
  7. Simplex, a brand of Johnson Controls: [www.simplex-fire.com/#sle](http://www.simplex-fire.com/#sle).
  8. Edwards Fire Systems, a brand of Carrier: [www.edwardsfiresafety.com/#sle](http://www.edwardsfiresafety.com/#sle).
  9. Same manufacturer as control units.

#### **2.02 FIRE ALARM SYSTEM**

- A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
  2. Protected Premises: Entire building shown on drawings.
  3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
    - a. ADA Standards.
    - b. The requirements of the local authority having jurisdiction .
    - c. Applicable local codes.
    - d. Contract Documents (drawings and specifications).
    - e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
  4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
  5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
  6. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones on the same floor, on the floor above, and the floor below.
  7. Program notification zones and voice messages as directed by Owner.

8. Fire Alarm Control Unit: Location indicated on drawings.
  9. Combined Systems: Do not combine fire alarm system with other non-fire systems.
- B. Supervising Stations and Fire Department Connections:
1. Public Fire Department Notification: By on-premises supervising station.
  2. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.
- C. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
  2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
  3. Notification Appliance Circuits (NAC): Class B, Style W.
- D. Power Sources:
1. Primary: Dedicated branch circuits of the facility power distribution system.
  2. Secondary: Storage batteries.
  3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
  4. Each Computer System: Provide uninterruptible power supply (UPS).

### 2.03 FIRE SAFETY SYSTEMS INTERFACES

- A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
1. Sprinkler water control valves.
- B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
1. Sprinkler water flow.
  2. Duct smoke detectors.
- C. HVAC:
1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.
- D. Doors:
1. Smoke Barrier Door Magnetic Holders: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor. Refer to Section 087100.
  2. Electromagnetic Door Locks on Egress Doors: Unlock upon activation of any alarm initiating device or suppression system in smoke zone that doors serve as egress from. Refer to Section 087100.

### 2.04 COMPONENTS

- A. General:
1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
  2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
- B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.
- C. Master Control Unit: \_\_\_\_\_.
- D. Initiating Devices:
1. Addressable Systems:
    - a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
    - b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.
- E. Notification Appliances:
- F. Circuit Conductors: Copper or optical fiber; provide 200 feet (60 m) extra; color code and label.
- G. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
- H. Locks and Keys: Deliver keys to Owner.

- I. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
  - 1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
  - 2. Provide one for each control unit where operations are to be performed.
  - 3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
  - 4. Provide extra copy with operation and maintenance data submittal.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.
- B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.
- C. Obtain Owner's approval of locations of devices, before installation.
- D. Install instruction cards and labels.

#### **3.02 INSPECTION AND TESTING FOR COMPLETION**

- A. Notify Owner 7 days prior to beginning completion inspections and tests.
- B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- E. Provide all tools, software, and supplies required to accomplish inspection and testing.
- F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.
- G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

#### **3.03 OWNER PERSONNEL INSTRUCTION**

- A. Provide the following instruction to designated Owner personnel:
  - 1. Hands-On Instruction: On-site, using operational system.
  - 2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.
- B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
  - 1. Initial Training: 1 session pre-closeout.
- C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
  - 1. Initial Training: 1 session pre-closeout.
- D. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

#### **3.04 CLOSEOUT**

- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
  - 1. Be prepared to conduct any of the required tests.
  - 2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
  - 3. Have authorized technical representative of control unit manufacturer present during demonstration.
  - 4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.

5. Repeat demonstration until successful.

**3.05 MAINTENANCE**

- A. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
  1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
  2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
  3. Record keeping required by NFPA 72 and authorities having jurisdiction.
- B. Provide trouble call-back service upon notification by Owner:
  1. Provide on-site response within 2 hours of notification.
  2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
  3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.
- C. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.
- D. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.
- E. Comply with Owner's requirements for access to facility and security.

**END OF SECTION**

## SECTION 31 20 00

### EARTHWORK

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes earthwork for foundations, floor slabs, miscellaneous exterior concrete, concrete and asphalt pavements, yard piping and rough site grading.

##### 1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "*2020 Standard Specifications for Construction*".
- B. ASTM - American Society of Testing Materials, latest edition.

##### 1.03 DEFINITIONS:

- A. Maximum Density: Maximum unit weight per volume for an established material.
- B. Optimum Moisture: Percentage of water at maximum density.
- C. Borrow: Material required for earthwork construction in excess of the quantity of suitable material available from required excavation grading or cutting. Borrow may be necessary even though not shown on the plans.
- D. Suitable Excavated Material: Mineral (inorganic) soil free of cinders, refuse, sod boulders, rocks, pavement soft or plastic clays, vegetable or other organic material capable of being compacted as specified. Moisture content has bearing on the suitability of materials to be used.
- E. Granular Material: Coarse grained materials having no cohesion, which derive their resistance to displacement from internal stability.
- F. Cohesive Material: Fine grained material which produces resistance to displacement by mutual attraction between particles. Clays are cohesive.
- G. Rough Grade: Earth grade before placing structure or landscaping.
- H. Subgrade: Earth grade upon which a pavement structure is to be placed.
- I. Rock Excavation: Boulders or rock weighing 4,000 pounds (approximately one cubic yard) or more and all solid or ledge rock, slate, shale, sandstone and other hard materials that require continuous use of pneumatic tools, heavy rippers or continuous drilling and blasting for removal. Pavements are not included.
- J. Proof Rolling: Applying test loads over the rough grade or subgrade surface by means of a heavy pneumatic tire roller or other approved means, to locate and permit timely correction of deficiencies likely to adversely affect performance of the pavement structure.

#### 1.04 JOB CONDITIONS:

- A. If, during progress of the work, testing indicates that materials do not meet specified requirements, remove defective work and replace at no cost.
- B. Protect and preserve all public and private property including existing vegetation, landscape features, monuments within, along and adjacent to the work area.
- C. Moisture content has bearing on the suitability of material to be used.
  - 1. The moisture content of a material may be such that its use will require extensive manipulation to achieve required compaction.
  - 2. It is the Contractor's responsibility to determine the economics of using or disposing and replacing of such materials.
  - 3. Materials determined by the Contractor to be uneconomical for use may be disposed on-site in areas approved by the Engineer and shall be replaced with other material at no additional cost to the Owner.

### **PART 2 - PRODUCTS**

#### 2.01 MATERIALS:

- A. Fill:
  - 1. Granular Material shall be MDOT 902.07, Table 902-3, Class III limited to 1.0-inch maximum size.
  - 2. Select Granular Material shall be MDOT 902.07, Table 902-3, Class II or IIA limited to 1.0-inch maximum size.
  - 3. Suitable Excavated Material: ARTICLE 1.03 DEFINITIONS.
  - 4. Clay Liner Material: Unified Classification CL, CH, ML, MH.
- B. Topsoil: Surface soils containing organic matters and productive of plant life.
- C. Pipe Bedding: Compact granular material.

### **PART 3 - EXECUTION**

#### 3.01 PREPARATION:

- A. Clearing and Grubbing: MDOT Sections 201 and 202.
  - 1. Remove trees and shrubs as required, unless otherwise indicated.
  - 2. Grub out all stumps and roots:
    - a. To a minimum depth of 4 feet below finished grade within roadways.
    - b. To a minimum depth of 2 feet below finished grade in other locations.
  - 3. Remove all debris from site resulting from clearing and grubbing.
- B. Remove topsoil from all areas of new construction and stockpile on site in designated areas.
- C. Utilities:
  - 1. Before starting excavation, establish location and extent of underground utilities in work area.
  - 2. Notify utility companies to remove and relocate lines which are in conflict with the proposed utility.

D. Protect Plantings and other features to remain as part of final landscaping.

3.02 EXCAVATION:

- A. Excavate as required for construction of the work. Utilize or dispose of excavated materials as required.
  - 1. Protect excavation by shoring, bracing, sheet piling or other methods as required.
  - 2. Remove unsuitable material to firm underlying soils beneath footings, pipelines, floor slabs, paved areas and walks.
- B. Preparation of Subgrade:
  - 1. Compact top 12 inches of subgrade under footings, slabs, pavement structure areas and walks to ninety-five percent (95%) maximum density unless otherwise specified.
  - 2. Compact top 12 inches under landscaped areas to eighty-five percent (85%) maximum density.
- C. Utilities:
  - 1. Maintain, reroute or extend existing utility lines to remain in excavation area, as required.
  - 2. Protect utility services uncovered by excavation.
  - 3. Cap off, plug or seal discontinued utility services and remove from site within excavated areas.

3.03 FILL:

- A. Clay Liner: Place clay liner material in layers 9.0 inches deep compacted to minimum ninety-five percent (95%) Maximum Density.
- B. Landscape Areas: Place suitable excavated material or granular material in layers maximum 12 inches deep compacted to eighty-five percent (85%) maximum density.

3.04 ROUGH GRADING:

- A. Rough grade to levels, profiles, contours and elevations required for finished grades and surface treatment.
- B. Maintain the following rough grades:
  - 1. Sidewalk: 4 inches below finished grade.
  - 2. Floor slabs, exterior slabs and sidewalk at driveways: 6 inches below finished grade.
  - 3. Pavement surfaces: As shown on drawings.
  - 4. Landscape areas: 4 inches below finished grade to receive topsoil.

3.05 PROOF ROLL SUBGRADE SURFACE:

- A. Perform two complete passes over area to receive pavement structure.
- B. Correct deficiencies identified during proof rolling:
  - 1. Fill depressions with compacted material similar to subgrade soil.
  - 2. Undercut areas not providing satisfactory support for pavement structure:
    - a. Fill with compact granular material.
    - b. Place geotextile fabric when soil below undercut will not satisfactorily support construction equipment.



3.06 DEWATERING:

- A. Provide dry excavations until structures have been placed and fill is complete.
- B. Provide and maintain slopes, crowns, ditches and ponds to ensure satisfactory surface drainage at all times.
  - 1. Construct ditches and other drainage facilities necessary to remove ponded water as soon as practical to provide dry work areas for progression of the work.
  - 2. Interruption of surface drainage or underdrainage: Provide temporary drainage facilities until permanent drainage work complete.

3.07 COMPACTION:

- A. Place and compact all required materials and provide proper control of moisture content of the material and other details necessary to obtain satisfactory results.
  - 1. Remove materials that cannot be compacted with manipulation and moisture control.
  - 2. Replace with suitable excavated material or granular material at no additional cost.
- B. Correct any deficiencies resulting from insufficient or improper compaction. Retest if required.
- C. Provide equipment and personnel for access to test locations.
- D. Moisture - Density Relationship:
  - 1. Cohesive (Clays) or Granular (Sands) Soils: ASTM D1557 (Modified Proctor).
  - 2. Granular (Sands) Soils: Michigan Cone Test.
- E. Testing will be by ENGINEER or OWNER approved independent laboratory.

3.08 SURPLUS MATERIALS:

- A. Dispose of surplus or unsuitable materials on-site in areas designated by Owner.
- B. Disposal On-Site: In accordance with MDOT 201.03.A.4.

**END OF SECTION**

## SECTION 32 12 17

### HOT MIXED ASPHALT PAVING – SUPERPAVE MIXTURES

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes construction of new hot mixed asphalt (HMA) pavements and reconstruction of existing pavements with hot mixed asphalt pavement and related work.
- B. Definitions:
  - 1. Pavement structure: Any combination of subbase, aggregate base, base course, leveling course and surface course, including shoulders, placed on subgrade.
  - 2. Permanent pavement: All improved pavement surfaces above the quality of treated or untreated gravel.
  - 3. Subgrade: That portion of the earth grade upon which the pavement structure is to be placed.
  - 4. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
  - 5. HMA Pavement Courses:
    - a. Base course: The layer of specified or selected material of designed thickness placed on a subbase or a subgrade to support leveling and surface courses.
    - b. Leveling course: Layer of specified material placed on the base course in preparation for the surface course.
    - c. Surface course: The top layer of a pavement structure.
    - d. Additionally, The Top and Leveling courses are defined as the mixture layers within 4-inches of the surface; the base course is defined as all layers below 4 inches of the surface. For mixture layers which fall within the 4-inch threshold, the following rule should apply:
      - 1) If less than 25% of a mixture layer is within 4 inches of the surface, the mixture layer should be considered to be a base course
  - 6. Bond Coat: Asphalt emulsion used to enhance the adhesion between HMA courses.
  - 7. Maximum Specific Gravity of Asphalt (Gmm): The ratio of the weight in air of a unit volume of an un-compacted asphalt mixture to the weight of an equal volume of gas free distilled water at a given standard temperature.
  - 8. Maximum density (soils): Maximum unit weight of soil material according to Modified Proctor Method ASTM D1557.
  - 9. Density Control Target: Target density of an HMA mixture determined by multiplying the Gmm times the density of water (62.4lb/ft<sup>3</sup>).

##### 1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "2020 Standard Specifications for Construction".
- B. ASTM - American Society of Testing Materials, latest edition.
- C. MTM – Michigan Test Methods, latest edition.

### 1.03 SUBMITTALS:

#### A. Pre-Construction:

1. Job-mix formulas (JMF):
  - a. Provide a job-mix formula (JMF) for each HMA mix prepared by independent lab or approved by MDOT submittals two weeks prior to paving. The job-mix formula shall include, at a minimum, the Gmm, Gmb, Gb, Gse, Gsb and parameters listed in Tables 1 & 2 of this specification.
2. Material Certifications:
  - a. Provide certifications of quality by producer for the following:
    - 1) Aggregates.
    - 2) Asphalt cement.
    - 3) Prime coat.
    - 4) Bond coat.
    - 5) Pavement marking materials.

### 1.04 JOB CONDITIONS:

#### A. Seasonal Limitations:

1. Removal of permanent pavement: Unless otherwise specified, execute during the period from March 15 to October 15.
2. Restoration of permanent pavement: MDOT 501.03.I.1

#### B. Clean up promptly following pavement installation.

#### C. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent pavement installation is completed.

#### D. Driveway Closing: Twenty-four (24) hour maximum. Provide proper notice to property owner.

#### E. Allow access to the hot mixed asphalt plant for verification of mix proportions, aggregate gradations and temperatures.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS:

#### A. Subbase: Granular material Class II, MDOT 902.07, Table 902-3.

#### B. Aggregate Base: Aggregate 22A, MDOT 302.02 and 902.05.

#### C. Aggregate Surface:

1. Use Aggregate 22A when the aggregate surface will receive a hot mixed asphalt surface at a later date. MDOT 306.02 and 902.05.
2. Use Aggregate 23A when the aggregate surface will not receive a hot mixed asphalt surface. MDOT 306.02 and 902.05.

#### D. Maintenance Gravel:

1. Aggregate 21A, 21AA, 22A, 23A.
2. Salvaged aggregate or HMA millings if approved by the Owner or Owner's representative.

- E. Hot Mix Asphalt (HMA) Base Course:
  1. MDOT 501.02, HMA, 4EL
  2. MDOT 904.03, Asphalt binder 58-28
- F. Hot Mix Asphalt (HMA) Leveling Course:
  1. MDOT 501.02, HMA, 4EL
  2. MDOT 904.03, Asphalt binder 58-28
- G. Hot Mix Asphalt (HMA) Surface Course:
  1. MDOT 501.02, HMA, 4EL
  2. MDOT 904.03, Asphalt binder 58-28
  3. Aggregate Wear Index (AWI) None.
- H. Bond Coat: Asphalt material SS-1h. MDOT 501.02 and 904.03.C.
- I. Pavement Marking: MDOT 920.01.

2.02 MIXTURES:

- A. Furnish hot mixed asphalt mixture designed using Superpave mixture design methods.
- B. Reclaimed Asphalt Pavement (RAP) may be substituted for a portion of the new material required to produce the HMA mixture. Greater than 27% RAP binder by weight (MDOT Tier 3) is not allowed.
- C. *For all EL, and EML base course mixtures:* If greater than 17% RAP binder by weight (Tier 2) of the total binder is proposed for the mixture the selected binder grade shall be adjusted to compensate for the stiffness of the asphalt binder in the RAP. The Contractor shall supply blending chart and RAP test data used to determine the binder selection.
- D. All leveling and surfaces courses and all other mixtures used for base courses not specified above shall use the binder grade specified without adjustments if greater than 17% RAP binder by weight (Tier 2) is used.
- E. The following Table 1, Table 2, and Table 3 shall be used to determine the mix design criteria and volumetric properties of the specified mixture.

**Table 1: Superpave Mix Design Criteria**

Design Parameter	Mix Number			
	5	4	3	2
Percent of maximum specific gravity (%G <sub>mm</sub> ) at the design number of gyrations (N <sub>d</sub> )	96.0% <sup>(a)</sup>			
%G <sub>mm</sub> at the initial number of gyrations (N <sub>i</sub> )	See Table 3			
%G <sub>mm</sub> at the maximum number of gyrations (N <sub>m</sub> )	≤98.0%			
Voids in mineral aggregate (VMA) min % at N <sub>d</sub> (based on aggregate bulk specific gravity (G <sub>sb</sub> ))	15.00	14.00	13.00	12.00
Voids filled with asphalt (VFA) at N <sub>d</sub>	See Table 2 <sup>(b)</sup>			
Fines to effective asphalt binder ratio (P <sub>No200</sub> /P <sub>be</sub> )	0.6–1.2			
Tensile strength ratio (TSR)	80% min			
(a) Unless noted otherwise on the plans, design all mixtures to 96.0% of maximum specific gravity (%G <sub>mm</sub> ) at the design number of gyrations (N <sub>d</sub> ). During field production, increase percent of maximum specific gravity (%G <sub>mm</sub> ) at the design				

number of gyrations ( $N_d$ ) to 97.0%. Use liquid asphalt cement for regression of mixes unless otherwise noted on plans.

(b) For regressed mixtures the maximum criteria limits do not apply.

**Table 2: VFA Minimum and Maximum Criteria**

Estimated Traffic (million ESAL)	Mix Type	Top and Leveling Courses	Base Course
≤0.3	EL	70–80%	70–80%
>0.3 – ≤3.0	EML	65–78%	65–78%
>3.0 – ≤30	EMH	65–78% <sup>(a)</sup>	65–75%
>30 – ≤100	EH	65–78% <sup>(a)</sup>	65–75%

ESAL = equivalent single-axle load

(a) The specified VFA range for mix Number 5 is 73–76%.

**Table 3: Superpave Gyrotory Compactor (SGC) Compaction Criteria**

Estimated Traffic (million ESAL)	Mix Type	Number of Gyration <sup>(a)</sup>			
		%Gmm at ( $N_i$ )	$N_i$	$N_d$	$N_m$
≤0.3	EL	≤91.5%	7	50	75
>0.3 – ≤3.0	EML	≤90.5%	7	75	115
>3.0 – ≤30	EMH	≤89.0%	8	100	160
>30 – ≤100	EH	≤89.0%	9	125	205

ESAL = equivalent single-axle load

(a) Compact mix specimens fabricated in the Superpave gyrotory compactor (SGC) to  $N_d$ . Use height data provided by the SGC to calculate volumetric properties at  $N_i$ . Compact mix specimens at optimum  $P_b$  (percent asphalt binder content) to verify  $N_m$  for mix design specimens only.

- F. The following Table 4 and Table 5 shall be used to determine the aggregate properties of the specified mixture.

**Table 4: Superpave Final Aggregate Blend Gradation Requirements**

Standard Sieve	Mix Number				
	5	4	3 Leveling Course	3 Base Course	2
	% Passing Criteria (Control Points)				
1½ inch	—	—	—	—	100
1 inch	—	—	100	100	90–100
¾ inch	—	100	90–100	90–100	≤90
½ inch	100	90–100	≤90	≤90	—
⅜ inch	90–100	≤90	—	—	—
No. 4	≤90	—	—	—	—
No. 8	47–67	39–58	35–52	23–52	19–45
No. 16	—	—	—	—	—
No. 30	—	—	—	—	—
No. 50	—	—	—	—	—

No. 100	—	—	—	—	—
No. 200	2.0–10.0	2.0–10.0	2.0–8.0	2.0–8.0	1.0–7.0

**Table 5: Superpave Final Aggregate Blend Physical Requirements**

Est. Traffic (million ESAL)	Mix Type	Minimum Criteria						Maximum Criteria					
		% Crushed <sup>(a)</sup>		Fine Aggregate Angularity		% Sand Equivalent		LA Abrasion % Loss <sup>(b)</sup>		% Soft Particles <sup>(c)</sup>		% Flat and Elongated Particles <sup>(d)</sup>	
		Course(s)											
		Top and Leveling	Base	Top and Leveling	Base	Top and Leveling	Base	Top and Leveling	Base	Top and Leveling	Base	Top and Leveling	Base
<0.3	EL	55 / —	—	—	—	40	40	45	45	10	10	—	—
≥0.3 – <3	EML	75 / —	50 / —	43	40	40	40	35	40	5	5	10	10
≥3 – <30	EMH	90 / 85	80 / 75	45	40	45	45	35	35	3	4.5	10	10
≥30 – <100	EH	100 / 100	95 / 90	45	45	50	50	35	35	3	4.5	10	10

ESAL = equivalent single-axle load  
(a) XX / YY denotes that XX% of the coarse aggregate has one fractured face and YY% has at least two fractured faces.  
(b) If a blend of different aggregate sources, the abrasion value applies to each source.  
(c) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone, and particles that are structurally weak or non-durable in service.  
(d) Maximum by mass with a 1:5 aspect ratio.

### PART 3 - EXECUTION

#### 3.01 PREPARATION:

- A. Removal: Remove all existing pavement structure required, as shown on the drawings.
  - 1. Pavement remnant limit: Remove pavement, curb, gutter, curb and gutter, sidewalk or similar structures to existing joint, where dimension is less than 3 feet.
  - 2. Provide saw cut joint full depth at removal limit.
  - 3. Butt joint: Provide on overlay projects where new pavement meets existing pavement. MDOT 501.03.C.3.
  - 4. Restore existing permanent pavement disturbed by construction equipment at no additional cost.
- B. Dispose of all material removed during the construction.
- C. Crushing and shaping: MDOT 305.
- D. Cold-milling existing HMA surface: MDOT 501.
- E. Subgrade:
  - 1. Obtain approval prior to placing the subbase or aggregate base course.
  - 2. Construct to the required line, grade and cross section. MDOT 205.03.N.
    - a. Tolerance if subbase is required: Trim within 1 inch of design grade.
    - b. Tolerance if subbase is not required: Trim within ¼ inch of design grade.
  - 3. Compaction:
    - a. Compact to not less than ninety percent (90%) of the maximum density according to the Modified Proctor Method ASTM D1557.
    - b. Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- F. Excavation: Conform to MDOT 205.03.G.

G. Embankment: Conform to MDOT 205.03.H and 205.03.I.

### 3.02 PERFORMANCE:

#### A. Subbase:

1. Thickness: Conform to design cross section.
2. Construction method:
  - a. Place in equal layers not exceeding 15 inches loose measure.
  - b. Spread evenly and compact to not less than ninety-five percent (95%) maximum density according to Michigan Sand Cone Test.
3. Tolerance: Construct sub-base to plan grade within a tolerance of  $\pm 0.5$  inch.

#### B. Aggregate Base:

1. Thickness: Conform to design cross section.
2. Construction Method: MDOT 302.03.
3. Tolerances:
  - a. Curbed streets: Shape the aggregate base course to the design grade and cross section within a tolerance of  $\pm \frac{1}{4}$  inch.
  - b. Other: Shape within a tolerance of  $\pm \frac{1}{2}$  inch of the design grade and cross section.
  - c. Check and correct grades and cross section prior to HMA placement if traffic use is allowed.

#### C. Aggregate Surface:

1. Thickness: Provide 8 inches compacted in place in two (2) equal courses, unless otherwise specified.
2. Construction Method: MDOT 306.03.

#### D. Shoulder (aggregate):

1. Thickness: Provide 4 inches of compacted aggregate shoulder on an aggregate base, unless otherwise noted.
2. Construction Method: MDOT 307.03.

#### E. Shoulder (other than aggregate):

1. Thickness: Provide 4 inches of compacted soil or topsoil on an aggregate base, unless otherwise noted.

#### F. Hot Mixed Asphalt Base:

1. Construction Methods: Conform placement of the hot mixed asphalt base mixture not exceeding lifts of 3 inches in accordance with MDOT 501.03.
2. Tolerances:
  - a. Curbed streets: Shape the hot mixed asphalt base course to the design grade and cross section, within a tolerance of  $\pm \frac{3}{8}$  inch.
  - b. Other: Unless otherwise specified, shape within  $\pm \frac{3}{4}$  inch of the design grade and cross section.

#### G. Bond Coat:

1. Construction Method: MDOT 501.03.D.
2. Application Rate: Provide 0.15 gallon per square yard.

#### H. Hot Mixed Asphalt Leveling and Surface:

1. Cutting: Saw vertically in straight lines parallel or perpendicular to pavement centerline.

2. Thickness: Do not place hot mixed asphalt surface course mixture in lifts exceeding 2 inches unless otherwise approved. Provide design thickness.
  3. Construction Methods:
    - a. Paving: Conform method of paving to MDOT 501.03.
    - b. Prior to placement of hot mixed asphalt surface, verify crowns and grades of roadway for positive drainage. Any deficiencies in grade or crown shall be corrected prior to placement of surface course.
  4. Tolerances: Hot mixed asphalt surface on streets with new curbs shall have a finish elevation of ¼ inch above curb.
  5. Asphalt Yield: The design asphalt yield has been based on 110 lbs./syd per inch of thickness. Construction asphalt yield in excess of 15% of the plan yield shall not be paid.
- I. Hot Mixed Asphalt Drive Approach:
1. Preparation: Construct drive approach on prepared subgrade or embankment as required to meet plan grades.
  2. Aggregate Base: Provide 8-inches of Aggregate 22A compacted in place.
  3. HMA Mixture: Provide 3-inches of HMA 4EL.
- J. Hot Mixed Asphalt Patching:
1. Preparation: Saw cut vertically in straight lines parallel or perpendicular to pavement centerlines. Minimum dimension of area to be patched shall be 2 feet for placement and compaction of materials.
  2. Aggregate Base: Provide a minimum of 6 inches of Aggregate 22A compacted in place.
  3. HMA Mixture: Match existing pavement thickness (minimum 3 inches).

### 3.03 STRUCTURE COVER ADJUSTMENT:

- A. Construction Method: MDOT 403.03.C.
1. Adjust structure castings to finish grade or to a maximum of ¼ inch below finish grade of all manholes, catch basins and valve boxes.
    - a. Set grades of castings and valve boxes from street grades with castings tilted where necessary to meet proposed street grades and crown.
    - b. All castings, when adjusted to finish grade shall be placed in a bed of Concrete Grade 3500 per MDOT Section 1004 placed in the entire area disturbed for casting adjustment.
  2. Adjust castings to finish grade after the leveling course is complete.
    - a. Castings shall be kept below grade or flush with the proposed sand subgrade so as not to conflict with grading operations or conflict with placement of leveling course.
    - b. HMA removed from area for casting adjustment shall be saw cut square around the casting.
  3. Adjustment of new structures will not be a pay item.

### 3.04 PAVEMENT MARKINGS

- A. Construction Method: MDOT 811.03
- B. Contractor shall layout all proposed markings in accordance with the MMUTCD and MDOT Standards and as shown on the Drawings prior to placement for Owner or Owner's representative review.



3.05 TESTING AND INSPECTION:

- A. Observation: By the designated authorized representative.
- B. Aggregates:
  - 1. Sampling and Analysis: Michigan Testing Methods, Series 100.
  - 2. Exception: Provide certification of approved stockpiled material.
- C. Hot Mixed Asphalt Pavement Density:
  - 1. Density acceptance of HMA mixtures will be measured with a nuclear density gauge using the Gmm from the approved Job-Mix Formula for the density control target. The required in place density of the HMA mixture shall be 92.0-96.0% of the density control target.
  - 2. The Contractor is responsible for determining Quality Control Density and establishing a rolling pattern that will achieve the required in place density.
- D. Hot Mixed Asphalt Mix Composition:
  - 1. Sampling:
    - a. Acceptance sampling shall include a minimum of two samples per mix type for each day of production with no less than three samples for each mix type per project.
    - b. Method of sampling per MDOT Standard Specifications for Construction requirements.
  - 2. Extraction: ASTM D2172
  - 3. Sieve Analysis: ASTM C117 and ASTM C136
  - 4. Tolerance: Acceptance tolerances for HMA parameters are detailed in the following Table.

**Table 3: Uniformity Tolerance Limits for HMA Mixtures**

PARAMETER	Surface & Leveling Course	Base Course
	Range	Range
Binder Content	+ 0.50	+ 0.50
% Passing #8 and Larger Sieves	+ 8.0	+ 9.0
% Passing #30 Sieve	+ 6.0	+ 9.0
% Passing #200 Sieve	+ 2.0	+ 3.0
1. The mixture shall be proportioned to test as closely as possible to the Job-Mix-Formula. 2. The crushed particle content of the aggregate shall not be more than 10 percentage points above or below the crush particle content listed in the approved JMF.		

- 5. Acceptance: If for any one mixture, two consecutive aggregate gradations on one sieve, or binder contents exceed the uniformity tolerance or do not meet the minimum requirements for crushed particle content the mixture will be rejected.

**END OF SECTION**

## SECTION 32 13 13

### CONCRETE PAVING

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes construction of new concrete pavements and reconstruction of existing pavements with concrete pavement and related work.
- B. Definitions:
  - 1. Pavement Structure: Any combination of subbase, base course and surface course, including shoulders, placed on subgrade.
  - 2. Permanent pavement: All improved pavement surfaces above the quality of treated or untreated gravel.
  - 3. Subgrade: That portion of the earth grade upon which the pavement structure is to be placed.
  - 4. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
  - 5. Base Course: The layer of specified material of designated thickness placed on a subbase or subgrade to support the surface course.
  - 6. Surface Course: The top layer of a pavement structure.
  - 7. Maximum density (soils): Maximum unit weight of soil material according to Modified Proctor Method ASTM D1557.

##### 1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, *"2020 Standard Specifications for Construction"*.
- B. ASTM - American Society of Testing Materials, latest edition.

##### 1.03 SUBMITTALS:

- A. Pre-Construction:
  - 1. Concrete Mix Designs:
    - a. Provide a concrete mix design for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.
  - 2. Material Certifications:
    - a. Provide certifications of quality by producer for the following:
      - 1) Cement.
      - 2) Aggregates.
      - 3) Admixtures.
      - 4) Curing Compound.
      - 5) Steel Reinforcement.
      - 6) Pavement marking materials.
  - 3. Batch Tickets:
    - a. In accordance with MDOT 1001.03.A.4.

- B. Post-Construction:
  - 1. Concrete Test Specimens:
    - a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

1.04 JOB CONDITIONS:

- A. Seasonal Limitations:
  - 1. Removal of permanent pavement: Unless otherwise specified, execute during the period from March 15 to October 15.
  - 2. Restoration of permanent pavement: Unless otherwise specified, execute during the period from April 15 to November 15.
- B. Protect concrete from being damaged by rain. Concrete damaged by rain shall be replaced at no cost.
- C. Weather Limitations:
  - 1. Cold Weather Protection: Protect concrete from freezing until the concrete has achieved a compressive strength of at least 1000psi.
- D. Clean up promptly following pavement installation.
- E. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent pavement installation is completed.
- F. Driveway Closing: Twenty-four (24) hour maximum. Provide proper notice to property owner.
- G. Allow access to the concrete plant for verification of mix proportions and aggregate gradations.

**PART 2 - PRODUCTS**

2.01 MATERIALS:

- A. Subbase: Granular material Class II, MDOT 902.07, Table 902-3.
- B. Aggregate Base: Aggregate 22A unless otherwise specified. MDOT 302.02 and 902.05.
- C. Maintenance Gravel:
  - 1. Aggregate 21A, 21AA, 22A, 23A.
  - 2. Salvaged aggregate or HMA millings.
- D. Pavement Marking: MDOT 920.01.
- E. Concrete:
  - 1. Use Concrete Grade 3500 per MDOT Section 1004.
  - 2. Use Concrete Grade P-NC per MDOT Section 1006 where indicated on drawings to achieve early compressive strength.
- F. Curing Compound:
  - 1. Provide white membrane curing compound MDOT 903.06, unless otherwise noted.
- G. Chemical admixtures: MDOT Section 903.
  - 1. Use of Calcium Chloride is not allowed.

H. Steel Reinforcement: MDOT Section 905.

I. Joint Materials: MDOT Section 914.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION:**

- A. Removal: Remove all existing pavement structure as required, as shown on the drawings.
  - 1. Pavement remnant limit: Remove pavement or similar structures to existing joint, where dimension is less than 3 feet.
  - 2. Provide saw cut joint full depth at removal limit.
  - 3. Restore existing permanent pavement disturbed by construction equipment at no additional cost.
- B. Dispose of all material removed during the construction.
- C. Subgrade:
  - 1. Obtain approval prior to placing the subbase or aggregate base.
  - 2. Construct to the required line, grade and cross section. MDOT 205.03.N.
    - a. Tolerance if subbase is required: Trim within 1 inch of design grade.
    - b. Tolerance if subbase is not required: Trim within  $\frac{3}{4}$  inch of design grade.
  - 3. Compaction:
    - a. Compact to not less than ninety percent (90%) of the maximum density according to the Modified Proctor Method ASTM D1557.
    - b. Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- D. Excavation: Conform to MDOT 205.03.G.
- E. Embankment: Conform to MDOT 205.03.H and 205.03.I.

#### **3.02 PERFORMANCE:**

- A. Subbase:
  - 1. Thickness: Conform to design cross section.
  - 2. Construction method:
    - a. Place in equal layers not exceeding 15 inches loose measure.
    - b. Spread evenly and compact to not less than ninety-five percent (95%) maximum density according to Michigan Sand Cone Test.
  - 3. Tolerance: Construct subbase to plan grade within a tolerance of  $\pm 0.5$  inch.
- B. Aggregate Base:
  - 1. Thickness: Conform to design cross section.
  - 2. Construction Method: Conform the placing of aggregate base course with MDOT 302.03.
  - 3. Tolerances:
    - a. Shape the aggregate base course to the design grade and cross section, within the tolerance of  $\pm \frac{1}{4}$  inch.
    - b. Check and correct grades prior to pavement placement if traffic use is allowed.
- C. Concrete Pavement:
  - 1. Thickness: Conform to Design Cross Section.

2. Construction Methods: Unless otherwise specified, conform paving procedures to MDOT 602.03.
3. Provide reinforcement and lane ties as indicated in the drawings.

D. Joints:

1. Provide construction, expansion and control joints as indicated in the plans and in accordance with MDOT 602.03.
2. Seal joints in accordance with MDOT 602.03.R and 602.03.S.

E. Pavement Markings

1. Construction Method: MDOT 811.03.
2. Contractor shall layout all proposed markings in accordance with the MMUTCD and MDOT Standards and as shown on the Drawings prior to placement for Owner or Owner's representative review.

3.03 TESTING AND INSPECTION:

A. Observation: By the designated authorized representative.

B. Concrete Acceptance Testing:

1. Temperature, slump and air content: Conduct tests on the first load of concrete placed and at a minimum of once per hour of continuous pour.
  - a. The temperature of the concrete shall be between 45°F and 90°F at the time of placement.
  - b. Slump of the concrete shall not exceed 3.0 inches, or the slump indicated in the approved mix design.
  - c. Air content at the time of placement shall be  $6.5 \pm 1.5$  percent, unless otherwise noted.
2. Strength: The average compressive strength of two companion cylinders shall be equal to or greater than 3,500 psi at 28 days, unless otherwise noted.
  - a. Sample for strength at least once every 200 cubic yards.
  - b. Concrete strength will be based on compressive strength.
  - c. A single strength test consists of two cylinders.
  - d. Temperature, slump and air content tests shall be run at the same time as cylinders are cast.
3. Additional cylinders or beams may be molded and tested at the Contractors expense for early breaks and determination of concrete strength for opening to traffic or construction equipment.

C. Aggregates:

1. Sampling and Analysis: Michigan Testing Methods, Series 100.
2. Exception: Provide certification of approved stockpiled material.

**END OF SECTION**

## SECTION 32 13 14

### CONCRETE SIDEWALK, SIDEWALK RAMPS AND DRIVEWAYS

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes work required for concrete sidewalks, sidewalk ramps driveways.
- B. Definitions:
  - 1. Pavement Structure: The combination of the base, subbase and bituminous or concrete surface placed on the subgrade. Pavement includes gravel, bituminous and concrete surfaced streets and driveways.
  - 2. Subgrade: The portion of the earth grade on which the concrete sidewalk is to be placed.
  - 3. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.

##### 1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "*2020 Standard Specifications for Construction*".
- B. ASTM - American Society of Testing Materials, latest edition.
- C. ADAAG – Americans with Disabilities Act Accessibility Guidelines.
- D. PROWAG – Public Rights-of-Way Accessibility Guidelines

##### 1.03 SUBMITTALS:

- A. Pre-Construction:
  - 1. Concrete Mix Designs:
    - a. Provide a concrete mix design for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.
  - 2. Material Certifications:
    - a. Provide certifications of quality by producer for the following:
      - 1) Cement.
      - 2) Aggregates.
      - 3) Admixtures.
      - 4) Curing Compound.
      - 5) Steel Reinforcement.
      - 6) Pavement marking materials.
  - 3. Batch Tickets:
    - a. In accordance with MDOT 1001.03.A.4.
- B. Post-Construction:
  - 1. Concrete Test Specimens:
    - a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

#### 1.04 JOB CONDITIONS:

- A. General Limitations: Concrete shall not be placed between November 1 and April 1 without approval of the Owner. Concrete shall not be placed when air temperature in the shade is less than 40° F and falling. Concrete shall not be placed if portions of the base, subbase, or subgrade layers are frozen, or if the grade exhibits poor stability from excessive moisture levels. Chemicals shall not be added to reduce the freezing point. Any deviation from the above, when authorized, will require protection from freezing until the concrete has attained a compressive strength of at least 1,000 psi (1,000 psi strength will typically be attained after 2 days of curing). Concrete damaged by frost action shall be removed and replaced.
- B. Clean-up promptly following sidewalk installation.
- C. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent sidewalk installation is completed.
- D. Driveway Closing: 24 hours maximum for removal and replacement of concrete plus additional 96 hours (4 days) for curing. Prior to replacement, the removed portion of the driveway shall be brought up to its proposed grade with gravel and/or bituminous.
- E. Protect areas under construction with lighted barricades and reflectorized fencing in accordance with applicable MDOT, MIOSHA and ASHA regulations.

#### **PART 2 - PRODUCTS**

#### 2.01 MATERIALS:

- A. Subbase: Granular material MDOT Class II, MDOT 902.07, Table 902-3.
- B. Concrete:
  - 1. Sidewalk and Sidewalk Ramps:
    - a. Use Concrete Grade 3500 per MDOT Section 1004 modified to 100% limestone aggregate.
  - 2. Driveways:
    - a. Use Concrete Grade 3500 per MDOT Section 1004.
    - b. Use Concrete Grade P-NC per MDOT Section 1006 where indicated on drawings to achieve early compressive strength.
- C. Joint Filler: MDOT Section 914.
- D. Forms: Rigid in accordance with MDOT 803.03.B, except at curved sections which shall utilize a bendable material to provide a uniform radius, supported at adequate intervals.
- E. Aggregate Base: Aggregate 22A, MDOT 302.02 and 902.05.
- F. Bituminous Patching: MDOT Bituminous Mix 13A, unless otherwise specified.
- G. Bituminous Bond Coat: Asphalt material SS-1h. MDOT 501.02 and 904.03.C.
- H. Detectable Warning Surfaces:
  - 1. Cast ductile iron plate with anchor lugs.
  - 2. Slip resistant textured surface.
  - 3. Color and finish: Black asphalt dip.

4. Provide minimum 5-foot width with 2 – 30" plates.
5. Meet ADAAG.
6. Manufacturer: East Jordan Iron Works or Neenah Foundry Company.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION:**

- A. Removal: Remove or saw cut at the existing joint in area of removal. Remove adjacent pavement structure necessary to place forms.
- B. Removal of subgrade material to maintain existing sidewalk elevation and meet specified concrete thickness shall be included in the cost of the sidewalk.
- C. Disposal of all removed material shall be performed by Contractor. Always keep all equipment and removed material off private property.
- D. For sidewalk crossing bituminous drives: Saw cut existing bituminous and use as forms.
- E. For sidewalk crossing concrete drives: Remove or saw cut at the existing joint.
- F. Cut and protect tree roots.
- G. Excavation: Form subgrade by trenching, excavating or filling to the required elevation.
- H. If unsuitable material exists below subgrade, remove unsuitable material. If unsuitable material is removed, place a minimum 4-inch sand subbase to elevation required for bottom of concrete. In fill areas, the subbase shall be at least 1 foot wider than the sidewalk width.
- I. Compact subbase to 95% maximum density.
- J. Scheduling: Maximum time between removal and replacement of existing sidewalk or excavation and placement of sidewalk shall be 7 days.
- K. Contractor shall notify Owner or Owner's representative of plans to pour concrete a minimum of 24-hours in advance the concrete pour. The Contractor shall provide a minimum of 2 hours between forming and pouring to allow for review. Failure to provide notice will be considered cause to reject the work.

#### **3.02 PERFORMANCE:**

- A. Sidewalk and Sidewalk Ramp Requirements:
  1. All sidewalks shall be a minimum of 5 feet in width, with the grade of ¼ inch per foot from the property towards the street, unless otherwise directed.
  2. All sidewalks shall be a minimum of 4 inches thick except through driveways where they shall be a minimum of 6 inches thick for residential and 8 inches thick, with WW mesh reinforcement, for commercial / industrial. Sidewalks shall continue through commercial driveways.
  3. Sidewalk ramps shall have a uniform grade except as necessary for short grade changes and shall be in conformance with the Draft PROWAG, ADAAG and these specifications. Detectable warning surfaces shall be provided, unless otherwise directed.
  4. Sidewalk ramps shall be 6-inch thick.
  5. Detectable warning surfaces:



- a. Provide for tactile and visual warning that contrast visually with adjacent walking surfaces, either light-on-dark or dark-on-light.
  - b. Provide cast ductile iron detectable warning plates embedded into newly cast concrete. Provide same width as sidewalk, minimum. Install in accordance with manufacturer's recommendations, ADAAG and these specifications. Surface applied products will not be allowed. Do not construct detectable warnings by forming or stamping in newly cast concrete.
  - c. Provide detectable warning plates on sidewalk ramps at intersections and where the sidewalk crosses commercial driveways with curbed Detail M openings and commercial driveways that are stop-controlled.
- B. Driveway Requirements:
1. Residential Driveways: 6 inches thick.
  2. Commercial and Industrial Driveways: 8 inches thick.
- C. Structure Adjustment: Any utility structures in the sidewalk or ramp not conforming to the finished grade shall be adjusted to grade. Conform to MDOT 403.03.C.
- D. Concrete Mixing and Delivery: Transit mix concrete conforming to MDOT 1001.03.E.
- E. Placing and Finishing Concrete:
1. Place concrete on a moist base in one (1) lift to the specified depth. The concrete shall be thoroughly spaded along the faces of the forms before finishing operations are started. The concrete shall be struck off to the required grade and cross section.
  2. All edges and joints shall be slightly broomed transversely to roughen the surface after the concrete has received a float finish. The sidewalk ramps shall be textured with a coarse broom transversely to the ramp slope.
- F. Curing and Protection:
1. Concrete shall be cured and protected as specified under MDOT Section 602.03.M and 602.03.T except that pedestrian traffic may be allowed after 48 hours if authorized. Curing compound shall be applied immediately following finishing operations.
- G. Joints:
1. Joints shall be constructed to true line with their faces perpendicular to the surface of the sidewalk and shall not vary more than  $\frac{1}{4}$  inch from their designated position. Transverse joints shall be constructed at right angles to centerline of the sidewalk and longitudinal joints shall be constructed parallel to the centerline unless otherwise required. When sidewalk is constructed in partial width, transverse joints shall be placed in line with like joints in the existing sidewalk.
  2. The concrete at the faces of all joints shall be thoroughly spaded or vibrated and compacted to fill all voids and the surface shall be finished smooth and substantially true to grade.
  3. One-half ( $\frac{1}{2}$ ) inch transverse expansion joints shall be placed in line with all expansion joints in abutting curb, gutter or combination curb and gutter. When sidewalk does not abut such pavement,  $\frac{1}{2}$  inch transverse expansion joints shall be placed at intervals not exceeding 40 feet and at all transitions between 4 inch and 6-inch sidewalk. Expansion joint filler shall extend the full depth of the joint with the top slightly below the finished sidewalk surface. The filler shall be supported temporarily until concrete is poured against it.
  4. One-half ( $\frac{1}{2}$ ) inch longitudinal expansion joints shall be placed between the sidewalk and the back of abutting parallel curb or gutter, between the sidewalk and buildings, or other rigid structures.

5. One-half (½) inch expansion joints shall be placed between sidewalk approaches and the back of curb and gutter, or the edge of pavement, including bituminous driveways.
  6. Contraction joints shall be placed at 5-foot intervals. They shall divide sidewalk into areas not more than 36 square feet nor less than 16 square feet. Contraction joints will be produced by slab division forms extending to the full depth of concrete or by cutting joints in the concrete after floating to a depth of not less than ¼ the thickness of the concrete. The cut joints shall not be less than 1/8-inch or more than ¼ inch in width and shall be finished smooth and substantially true to line.
- H. Backfilling and bituminous patching:
1. After concrete has gained sufficient strength (70% of design), all rails, forms, stakes and supports shall be removed in a manner as not to injure finished concrete and all exposed edges of the concrete shall be backfilled, compacted and leveled immediately.
  2. In areas where the sidewalk crosses bituminous drives, saw cut existing bituminous. Bituminous patching shall be placed and compacted.
- I. Bituminous Patching:
1. Place minimum 4 inches of aggregate base 22A and compact to ninety-five percent (95%) of maximum density.
  2. Place minimum 2 inches of MDOT Bituminous Mix 13A.
- J. Concrete curb and gutter: Owner's Standard.
1. Match existing curb and gutter.
  2. Construction methods: MDOT 802.03.

### 3.03 TESTING AND INSPECTION:

- A. Observation: By designated authorized representative.
1. Inspection of forms is required prior to pouring concrete.
- B. Acceptance Testing:
1. If initial testing indicates failed or nonconformance to specification, additional testing shall be paid by Contractor. Replace nonconforming material at no additional cost.

### 3.04 TREE ROOT CUTTING:

- A. The following information shall be used as a guide when trimming tree roots:
1. Excavate as shallow as possible in the area adjacent to the tree root.
  2. Make clean cuts with a saw or sharp chisel. Do not bury jagged or torn roots.
  3. Do not allow the exposed root ends to dry out. If exposed for more than a day, they can dry out. Cover all exposed roots with soil at the end of the day.
  4. Avoid cutting roots larger than 3.5 inches.

### 3.05 TREE ROOT BARRIER:

- A. Install tree root barrier along the sidewalk adjacent to trees to reduce future damage by tree roots. Installation shall be in accordance with manufacturer's recommendations.
- B. Install in 4-inch wide trench (with roots removed) adjacent to the sidewalk between the sidewalk and tree to a minimum depth of 30 inches. Secure with pins. Backfill carefully to avoid dislodging the barrier and compact firmly.
- C. Manufacturer: Typar Biobarrier or approved equal.

3.06 SCHEDULES (See Details attached)

- A. MDOT Standard Plan R-28-K CURB RAMP AND DETECTABLE WARNING DETAILS (7 sheets).
- B. MDOT Standard Plan R-29-J DRIVEWAY OPENINGS AND APPROACHES, AND CONCRETE SIDEWALK (4 sheets).

**END OF SECTION**

## SECTION 32 16 13

### CONCRETE CURBS & GUTTERS

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes work required for concrete curbs and gutters.

##### 1.02 REFERENCES:

- A. MDOT – Michigan Department of Transportation, “*2020 Standard Specifications for Construction*”.
- B. ASTM – American Society of Testing Materials, latest edition.

##### 1.03 SUBMITTALS:

###### A. Pre-Construction:

- 1. Concrete Mix Designs:
  - a. Provide a concrete mix design submittals for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.
- 2. Material Certifications:
  - a. Provide certifications of quality by producer for the following:
    - 1) Cement.
    - 2) Aggregates.
    - 3) Admixtures.
    - 4) Curing Compound.
    - 5) Steel Reinforcement.
    - 6) Pavement marking materials.
- 3. Batch Tickets:
  - a. In accordance with MDOT 1001.03.A.4.

###### B. Post-Construction:

- 1. Concrete Test Specimens:
  - a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

##### 1.04 JOB CONDITIONS:

###### A. Weather and Temperature Limitations:

- 1. Protect the concrete from being damaged by rain.
- 2. Protect the concrete from freezing until it has attained a minimum compressive strength of 1,000 psi.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS:

###### A. Concrete:

- 1. Use Concrete Grade 3500 per MDOT Section 1004.

2. Use Concrete Grade P-NC per MDOT Section 1006 where indicated on the drawings to achieve early compressive strength.
- B. Steel Reinforcement: MDOT Section 905, epoxy coated.
  - C. Joint Filler: MDOT Section 914.
  - D. Lane Ties: MDOT Section 914.09.
  - E. Curing Compound: MDOT Section 903.06, white membrane curing compound.
  - F. Chemical Admixtures: MDOT Section 903.
    1. Use of calcium chloride is not allowed.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION:**

- A. Removal: Remove all existing pavement structure required, as shown on the drawings. MDOT 204.03.A.2.
- B. Dispose of all material removed during construction.
- C. Subgrade: Prepare base per MDOT 602.03.B.
  1. Obtain approval prior to placing sub-base and forms.
  2. Construct to the required line, grade and cross-section per MDOT 205.03.N.
  3. Compaction: Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- D. Contractor shall notify Owner or Owner's representative of plans to pour concrete a minimum of 24-hours in advance the concrete pour. The Contractor shall provide a minimum of 2 hours between forming and pouring to allow for review. Failure to provide notice will be considered cause to reject the work.

#### **3.02 PERFORMANCE:**

- A. Subbase:
  1. Thickness: Conform to design cross section.
  2. Construction to the required line, grade and cross section.
  3. Compaction: Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- B. Concrete Curb and Gutter:
  1. Place concrete on moist base.
  2. Construct curbing mechanically using slip forms or place with fixed forms including face forms.
  3. Epoxy coated steel reinforcement:
    - a. Place in accordance with Owner's standard and per the drawings.
    - b. Reinforcement shall be spliced by lapping at least 10 inches and securing with two (2) ties per splice.
    - c. Lane ties, where required, shall be placed in the correct position and spaced in accordance with the drawings.
    - d. At locations where proposed concrete abuts existing concrete, two #4 epoxy coated steel reinforcing bars shall be epoxy anchored into the existing concrete.

4. Concrete shall be consolidated during placement using a spade or vibration.
5. Finishing:
  - a. Round all exposed edges to a radius of approximately  $\frac{1}{4}$  inch including transverse joints.
  - b. Do not add water to the concrete surface to aid finishing.
  - c. Apply broom finish.
6. After removing forms and before applying curing compound, repair all honeycombed areas or voids with Type R-2 mortar. Excessive voids or honeycomb will require removal and replacement.
7. Joints:
  - a. Contraction joints shall be spaced evenly on 10-foot centers.
  - b. Expansion joints shall be full depth and located as follows:
    - 1) 10 foot each side of curb castings
    - 2) At the spring points of curb radius
    - 3) Every 250 feet
8. Curing and Protection: Concrete shall be cured and protected as specified under MDOT Section 602.03.M and 602.03.T. Curing compound shall be applied immediately following finishing operations.

### 3.03 STRUCTURE COVER ADJUSTMENT:

- A. MDOT 403.03.C:
  1. Adjust structure cover to finish grade with top of curb and pavement edge set to the proposed grade.
  2. Tilt casting towards back of curb a maximum of 1 inch and transition gutter line of concrete curb to gutter line of casting.
  3. Set casting in a bed of concrete or mortar prior to pouring curb.
  4. Concrete or mortar bed inside of casting shall be troweled smooth and shall be free of voids.

### 3.04 TESTING AND INSPECTION:

- A. Observation: By designated authorized representative.
- B. Acceptance Testing:
  1. If initial testing indicates failed or nonconformance to specification, perform additional test. If further testing verifies nonconformance, additional testing shall be paid by Contractor. Replace nonconforming material at no additional cost to Owner.
- C. Tolerance: Gutter and top of curb shall be finished within  $\frac{3}{16}$  inch in 10 feet when checked with a 10-foot straight edge.

**END OF SECTION**



## SECTION 33 11 00

### WATER MAINS

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes the work required for water mains, structures and appurtenant work installed by open-cut excavation methods.

##### 1.02 REFERENCES:

- A. AWWA - American Waterworks Association, latest edition.
- B. ANSI - American National Standards Institute, latest edition.
- C. ASTM - American Society of Testing Materials, latest edition.

##### 1.03 SUBMITTALS:

- A. Pre-Construction:
  - 1. Pipe & Fittings:
    - a. Manufacturer, material & AWWA/ASTM designation.
    - b. Joint construction details.
  - 2. Mechanically Restrained Joints:
    - a. Manufacturer, model number & material.
  - 3. Valves & Boxes:
    - a. Valve manufacturer, model number & AWWA designation.
    - b. Valve box manufacturer, model number, material & dimensional drawings.
  - 4. Fire Hydrants:
    - a. Manufacturer, model number, materials, AWWA designation.
    - b. Color, nozzle sizes & barrel length.
    - c. Hydrant flag manufacturer & model.
  - 5. Water Services:
    - a. Corporation Stops:
      - 1) Manufacturer, model, materials, sizes & copper alloy documentation.
    - b. Curb Stop & Box:
      - 1) Curb stop manufacturer, model, materials, sizes & copper alloy documentation.
      - 2) Box style, manufacturer, model & materials.
    - c. Service Tubing:
      - 1) Material, ASTM designation & sizes.
      - 2) Union manufacturer, model, materials, sizes & copper alloy documentation.
  - 6. Tracer Wire & Appurtenances:
    - a. Wire manufacturer, model & size.
    - b. Splice connectors.
    - c. Terminal end device details.
  - 7. Individual Valve Structure Build Sheets:
    - a. Top, bottom and invert elevations.
    - b. Pipe orientation.
    - c. Individual precast concrete section dimensions.
    - d. Prefabricated rubber boot material & manufacturer.
    - e. Casting manufacturer & model.



- B. Post Construction:
  - 1. Witnesses:
    - a. Three witness measurements to buried fittings, valves and curb boxes from permanent fixtures such as building corners.

1.04 JOB CONDITIONS:

- A. Interrupting Water Service:
  - 1. Scheduling: Obtain Owner's approval prior to interruption of service.
  - 2. Provide notice of twenty-four (24) hours to affected occupants and twenty-four (24) hours to Fire Department of time and duration.
  - 3. Provide stand-by service as required; outage not to exceed four (4) hours.
  - 4. Existing valve operation shall be by Owner's employees only.
  - 5. Prevent contamination of existing water mains.
- B. Install service lines after pressure and bacteriological testing is accepted.
- C. Clean up promptly following pipe installation within maximum of 600 feet behind pipe laying operation. Clean up includes backfill and rough grading.
- D. Salvage all existing valve boxes, curb boxes and hydrants removed and deliver to the Owner's yard. Hydrants shall be removed carefully without causing damage to the hydrant and fittings.

**PART 2 - PRODUCTS**

2.01 GENERAL:

- A. Cement Lining: AWWA C104 / ANSI A21.4 standard thickness for ductile iron pipe and fittings.
- B. Hydrant Leads: Ductile iron pipe with mechanical joints.
- C. All materials which may come in contact with water intended for use in the public water supply shall be certified to meet ANSI/NSF Standard 14, 61, 372 & 600.
- D. All chemicals which may come in contact with water intended for use in the public water supply shall be certified to meet ANSI/NSF Standard 60.

2.02 PIPE:

- A. PVC: AWWA C900, Pressure Class 165 (DR 25) or AWWA C909 Pressure Class 165. The pipe shall meet NSF Standard 14 for potable water and be stamped NSF-pw on the pipe wall.
- B. Ductile Iron: AWWA C151 / ANSI A21.50 and ANSI A21.51; Class 52.
- C. High density polyethylene (HDPE) pipe: HDPE pipe shall be made from a high density, extra high molecular weight material designated as PE3408 with an SDR of 11 or less with working pressure of at least 160 psi. ASTM D3350-83 cell class 345434C. The pipe shall meet current AWWA C906 (4-63 inches). Materials must be listed and approved for use with potable water under ANSI/NSF Standards.

D. Service Tubing:

1. Copper: ASTM B88, Type K annealed and soft temper.
2. Polyethylene (PE): CTS-OD PE 4710 per ASTM D2737, SDR 9, 200 psi.

2.03 JOINTS:

A. Ductile Iron Pipe and Fittings:

1. Mechanical: AWWA C111 / ANSI A21.11.
2. Push-on: AWWA C111 / ANSI A21.11.
3. Foster Adaptors by INFACT Corporation may be used.
  - a. Epoxy Coating

B. PVC Plastic Pipe: Bell and spigot with elastomeric rubber ring gaskets ASTM D-3139.

C. HDPE

1. Sections of polyethylene pipe shall be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment and an interfacial fusion pressure of 75 psi. The butt fusion jointing will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All welds will be made using a Data Logger to record temperature, fusion pressure, with graphic representation of the fusion cycle. This log shall be part of the Quality Control records.
2. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.
3. Mechanical jointing will be used where the butt fusion method cannot be used. Mechanical jointing will be accomplished by either using a HDPE flange adapter with Ductile Iron back-up ring or HDPE Mechanical Joint adapter with Ductile Iron back-up ring.
4. Socket fusion, hot gas fusion threading, solvents and epoxies will not be used to join HDPE pipe.

D. Service Tubing and Fittings:

1. Copper: Flared or compression.
2. Polyethylene (PE): Mechanical or compression with stainless steel stiffener.

2.04 TRACER WIRE:

- A. If PVC or HDPE pipe is used in this project, the Contractor shall install a 10-gauge solid copper locator wire with insulation suitable for direct burial with the water main. The locator wire shall be attached to the main at approximately 15 feet intervals with plastic cable ties. Splices shall be soldered copper-to-copper and shrink-wrapped to establish insulation across spliced length. A minimum of 6 feet of wire shall be left accessible inside structures and at fire hydrants. The Contractor shall be responsible for testing continuity of wire locator.

2.05 FITTINGS:

- A. Ductile Iron: AWWA C110 / ANSI A21.10, or AWWA C153 / ANSI A21.53, Class 54, 250 psi working pressure through 12 inches and 150 psi above.
- B. HDPE
  - 1. Butt Fusion Fittings – Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99 and approved for AWWA use. Butt Fusion Fittings shall have a manufacturing stand of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers, Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records. All fittings shall be suitable for use as pressure conduits and per AWWA C906.
  - 2. Electrofusion Fittings – Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits per AWWA C906.
  - 3. Flanged and Mechanical Joint Adapters – Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

\*\*\*\*\*  
**NOTE TO SPECIFIER: Specify Owner's standard direction of opening on valves and hydrants. Choose one of the two paragraphs shown below for gate valve.**  
 \*\*\*\*\*

2.06 VALVES (OPENCOUNTERCLOCKWISE)

- A. Gate: AWWA C515 Resilient seated, epoxy coated surfaces, rubber encapsulated gate, bronze non-rising stem with double o-ring seal. Provide full diameter unobstructed flow. End connections shall match pipe.
- B. Boxes: Three (3) section cast iron with lid marked WATER:
  - 1. Upper section: Screw on adjoining center section and full diameter throughout. Place geotextile fabric around threaded joint of risers, if used.
  - 2. Center section: Minimum 5 inch inside diameter.
  - 3. Base section: Fit over valve bonnet and shaped round for valves through 10 inch and oval for 12 inch and over. Place geotextile fabric around valve bonnet.

2.07 HYDRANTS (OPEN COUNTERCLOCKWISE):

- A. AWWA C502, mechanical joint with drain outlet. The drain shall be unplugged to naturally well-drained soils if above the seasonal high groundwater level and plugged if below the seasonal high groundwater level, in poor draining soils, or in contaminated soils.
- B. Residential: 5-inch size with 6-inch inlet connection, 2 - 2½ inch hose nozzles and 1 - 4-inch pumper nozzle.
- C. Commercial: 5-inch size with 6-inch inlet connection, 2 - 4½ inch pumper nozzles.
- D. Provide National Standard Fire Hose Thread.
- E. Manufacturer: Owner's standard.

- F. Color: Owner's standard. Painted at factory with primer and two (2) coats.
- G. Barrel length shall be properly sized, so the centerline of the pumper nozzle is 21" to 27" above grade at the specified depth of cover over the pipe.
- H. Hydrant Extension: 36-inch maximum, limited to one per hydrant.
  - 1. Install between breakaway flange and top of hydrant lower section.

2.08 VALVE CHAMBERS:

- A. Precast Units: ASTM C478
  - 1. Joints: Cement mortar, preformed bituminous rope or "O" ring gaskets.
  - 2. Pipe openings: Pipe diameter plus 6 inch maximum.
- B. Concrete: 3500 psi 28-day, 4-inch maximum slump.
- C. Concrete Radial units: ASTM C139.
- D. Grade Rings: ASTM C478.
- E. Mortar: ASTM C270, 1-part Portland cement, 1-part lime and 3 parts sand by volume.
- F. Manhole Steps:
  - 1. Polypropylene encapsulated steel.
  - 2. Dimensions: 10-inches wide, 4-inch minimum clear tread depth, spaced 16 inches apart.
  - 3. Steps shall be in accordance with:
    - a. ASTM C 478
    - b. ASTM D 4101 (polypropylene)
    - c. ASTM A 615 (steel)
- G. Chamber Castings: East Jordan 1045Z1 A cover or Neenah R-1916-F two (2) hole cover; with letter W.

2.09 SERVICE FITTINGS:

\*\*\*\*\*  
**NOTE TO SPECIFIER: Specify Owner's standards.**  
 \*\*\*\*\*

- A. Corporation Stops:
  - 1. For copper service tubing:
    - a. Flared:
      - 1) Mueller Co. H-15000
      - 2) Ford FB-600
    - b. Compression:
      - 1) Mueller H-15008
      - 2) Ford F-1000 or FB-1000
  - 2. For polyethylene service tubing:
    - a. Mueller Co. H-15008
    - b. Ford F-1000 or FB-1000.
  - 3. Tapping asbestos-cement pipe only: Hays Mfg. Co. Hays-Seal.
- B. Curb Stops:

1. Flared:
    - a. Mueller Co. H-15204
    - b. Ford B22
  2. Compression:
    - a. Mueller H-15209
    - b. Ford B44
- C. Curb Boxes:
1. Arch Type:
    - a. Mueller Co. H-10306 (with H-10310 base for 2" curb stop)
    - b. Ford EA2-55-50
    - c. Tyler No. 6500
  2. Minneapolis Type:
    - a. Mueller Co. H-10300
    - b. Ford EM2-55-56
- D. Copper Alloy (Brass & Bronze) documentation for dezincification protection to be submitted in accordance with the Submittals section of this specification:
1. All parts of Corporation Stops, Curb Stops and Service Line Couplings and any other copper alloy fittings that come into contact with potable water must be constructed of an alloy with the following Copper Alloy Unified Number System (UNS) designations: C89833, C87850, C27451, C69300; or
  2. The copper alloy must be annealed with documentation provided; or
  3. The copper alloy must be tested for:
    - a. ISO 6509-1 and 6509-2; Dezincification resistance with acceptance criteria of:
      - 1) Maximum depth dezincification of 200 microns in any one location, and
      - 2) Average depth dezincification of 100 microns or less, and
    - b. Resistance to stress corrosion per the latest version of ISO 6957.

## 2.10 MISCELLANEOUS:

- A. Service Clamps:
1. Painted ductile iron saddle with dual stainless-steel bands and hardware
    - a. Ford FCD202
    - b. Mueller DR 2 S
- B. Tie Rods and Clamps: Clow Corp. or equal.
- C. Polyethylene Encasement:
1. Material: ASTM D-4976 Polyethylene, cross-laminated, high density, 4 mils thick, conforming to ASTM A674 and AWWA C105.
  2. Closing Tape: Minimum 2-inch-wide Poly Ken #900 or Scotchwrap #50.
- D. Mechanical Joint Restraint: Megalug by EBAA Iron Sales, Inc., or approved equal.
- E. Pipe Insulation: Closed cell extruded polystyrene 2-inch-thick rigid board manufactured by Dow, Owens Corning approved equal.
- F. Tapping Sleeve and Valves:
1. Compliant with AWWA C223
  2. 200 psi minimum working pressure.
  3. Sleeve Body shall be of all stainless-steel construction with passivated welds to restore stainless steel characteristics.

4. Flanged or Mechanical Joint outlet to accept valve.
5. Sleeve shall include  $\frac{3}{4}$ " diameter brass test plug located in the top of the branch outlet.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION:**

- A. Alignment and Grade:
  1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on plans.
    - a. Verify location and depth of existing utilities in advance of construction and provide adjustments in alignment and grade of water main at no additional cost to Owner.
  2. Depth of pipe: Minimum cover over pipe below finished grade by zones (unless otherwise indicated on plans):
    - a. Lower part of lower peninsula of Michigan and south (South of the north boundary of tier of townships 20 north which is approximately highway US 10): 5 feet - 0 inches.
    - b. Upper part of lower peninsula: 5 feet - 6 inches.
    - c. Upper Peninsula: 6 feet - 0 inches.
  3. High points in pipeline: Locate at services and hydrants.
- B. Bedding:
  1. Method: See *Methods of Bedding Pressure Pipe* detail.
    - a. Utilize Method II bedding for PVC & HDPE pipe.
  2. Provide bedding area backfill as specified elsewhere.
  3. Provide continuous bearing supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.
- C. Cleaning Pipe and Fittings:
  1. General: Provide interior free of foreign material and joint surfaces free of lumps and blisters.

#### **3.02 INSTALLATION:**

- A. General: Meet requirements of AWWA C600 for ductile iron pipe, AWWA C605 for PVC pipe, AWWA M55 for HDPE pipe, and these specifications.
- B. Laying Pipe:
  1. Prevent entrance of foreign material and plug watertight when left unattended.
  2. Provide pipe length and bedding as a unit in a frost free, dry trench.
  3. Provide minimum vertical separation between water main and crossing sanitary sewer, storm sewer or force main of 18 inches, measured from edge of pipe to edge of pipe. Provide minimum horizontal separation between water main and parallel sanitary sewer, storm sewer or force main of 10 feet, measured from edge of pipe to edge of pipe.
  4. Approval required for pipe lengths less than 6 feet.
  5. Joint deflection for ductile iron pipe shall not exceed the following values or as recommended by pipe manufacturer.

### Maximum Joint Deflection

Pipe Size	Push-On Joint		Mechanical Joint	
	Deflection Angle (Deg-Min)	Maximum Offset (inches)*	Deflection Angle (Deg-Min)	Maximum Offset (inches)*
4"	3° - 30'	14"	6° - 15'	23"
6"	3° - 30'	14"	5° - 20'	20"
8"	3° - 30'	14"	4° - 00'	15"
12"	3° - 30'	14"	4° - 00'	15"
16"	2° - 15'	8¼"	2° - 40'	10"
24"	2° - 15'	8¼"	1° - 45'	7"

\*Offsets are based upon 18-foot lengths of pipe

- C. Cutting Pipe:
1. PVC: Power saw or hand saw.
  2. Ductile iron: Power saw.
  3. Asbestos Cement: ASTM E 2394 – 04.
- D. Jointing:
1. Mechanical:
    - a. Lubricate as recommended by manufacturer.
    - b. Tighten bolts evenly to 75 to 90 foot-pounds.
  2. Push-on:
    - a. Lubricate as recommended by manufacturer.
    - b. Shape beveling as recommended by manufacturer.
  3. Pre-stressed Concrete Cylinder:
    - a. Lubricate as recommended by manufacturer.
    - b. Grouting: Fill external and internal recesses and trowel inside.
  4. Plastic: Manufacturer's standard.
- E. Setting Valves, Fittings and Fire Hydrants:
1. Valves: Set plumb.
  2. Valve boxes:
    - a. Base section: Center and plumb over operating nut and 2 inches above bonnet joint.
    - b. Upper section: Set cover ¼- inch below finished grade.
    - c. Witnesses: Provide 3 measurements to permanent surface features.
  3. Hydrants:
    - a. Positioning: Plumb with pumper nozzle facing curb and nozzle centerline 21-27 inches above finished grade.
    - b. Provide necessary length of 6-inch pipe for hydrant leads.
    - c. Provide access to all hydrants.
  4. Tie valves to tees and crosses and tie hydrants to valves.
  5. Provide mechanical joint restraint in accordance with the pipe restraint table in Paragraph 3.02 I.1.
- F. Chambers:
1. Base Bedding: Provide 4-inch pea stone with full and even bearing in impervious soils or wet conditions. Otherwise provide on undisturbed frost-free dry subgrade.
  2. Precast: Fill joint space completely and trowel.

3. Provide casting setting as follows:
  - a. Existing pavement: Flush:
  - b. Gravel grade: 4 inches below.
  - c. Unpaved areas: Finished grade.

G. Connections:

1. Existing water mains:
  - a. Provide temporary support during cut-in.
  - b. Disinfect by swabbing pipe, valves and fittings with four percent (4%) chlorine solution.
  - c. Pressure off: Install mechanical joint solid sleeve.
  - d. Pressure on: Install tapping sleeve, valve and box.
  - e. Asbestos cement pipe: Meet requirements of ASTM E 2394 – 04.
2. Tapping sleeve and valves:
  - a. Install in accordance with manufacturer's installation instructions.
  - b. Contractor shall verify material and outside diameter of the pipe to be tapped prior to purchasing tapping sleeve.
  - c. Disinfect sleeve and valve prior to installation by swabbing a 1% chlorine solution in accordance with other parts of this section.
  - d. After sleeve body and valve is installed and before the tap is made, the Contractor shall pressure test the sleeve by pressurizing through the test plug. The test must be conducted with the valve open using a mechanical joint plug or cap. Fill void with water expelling all air and pressurize to 150psi. No visible leaks may be observed.
  - e. Tap cutout diameter: The diameter of the tap cutout shall be maximized to preserve hydraulic efficiency of the connection. In no case shall the diameter of the cutout be less than 80% of the branch diameter.
3. Service lines:
  - a. Align at right angles to street or easement line.
  - b. Minimum depth shall be same as pipe.
  - c. Install after acceptable pressure test and chlorination of water main.
  - d. Tap must be installed on the main when under full pressure.
  - e. Curb boxes: Set plumb and provide 3 measurements to surface features.
    - 1) Locate at easement line within easement or at right-of-way line within road right-of-way, unless otherwise directed.
    - 2) Temporarily cover curb box with 5' long section of 4" PVC pipe to mark location during construction.
    - 3) Set cover ¼-inch below finished grade.
  - f. Tapping shall be at 45° above center and shall provide horizontal loop at corporation stop.
  - g. Plastic Pipe: Tap pipe using a hole saw cutter (new cutter) and double strap saddle per manufacturer's recommendation. No direct tapping allowed.

Maximum tap sizes shall be as follows:

Type of Pipe	Pipe Size									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Ductile Iron: Max Direct Tap Size	½"	¾"	1"	1¼"	1½"	2"	2"	2"	2"	2"
All Pipe: Max Tap Size w/ Double Strap	1"	1½"	2"	2"	2"	2"	2"	2"	2"	2"

H. Dead-end water main stubs longer than 20 feet:



1. Install standpipe with shutoff at dead ends to aid in chlorinating, testing and flushing. Remove standpipe upon approval of water main.

I. Pipe Joint Restraint:

1. Provide mechanical joint restraint for the minimum lengths shown in the table below:

PIPE RESTRAINT LENGTH REQUIRED (FEET)*							
Pipe Dia.	Tees 90° Bends	45° Bends	22½° Bends	11¼° Bends	Dead Ends	Reducers (one size)	**
4"	23'	9'	5'	2'	57'		
6"	32'	13'	6'	3'	82'	43'	63'
8"	41'	17'	8'	4'	104'	43'	55'
12"	58'	24'	12'	6'	149'	80'	120'
16"	74'	31'	15'	7'	192'	82'	110'
20"	89'	37'	18'	9'	233'	82'	104'
24"	104'	43'	21'	10'	272'	82'	99'
30"	123'	51'	25'	12'	328'	115'	148'
36"	141'	58'	28'	14'	379'	115'	140'

\* The length of restrained pipe required shown in the table above is based on trench backfill being compacted to 95% of the maximum density according to the Modified Proctor Method. The above table does not consider polyethylene wrapped pipe. If the pipe is wrapped with polyethylene, a greater length of restrained pipe will be required. Unless otherwise specified, a multiplier of 1.5 shall be used to determine the required length when the pipe is wrapped with polyethylene.

\*\* If straight run of pipe on small side of reducer exceeds this value, then no restrained joints are necessary.

- a. Tees: Pipe restraint length shown in the table above shall be provided in the branch direction. Also, the minimum length of pipe restraint in the straight through (run) direction shall be 10 feet on both sides of the tee.
- b. Bends: Pipe restraint length shown in the table above shall be provided on both sides of the bend.
- c. Dead End: Pipe restraint length shown in the table above shall be provided back from the dead-end plug.
- d. All joints shall be restrained for pipe within casings.
- e. All joints between bends on water main offsets shall be restrained.

J. Reaction Backing (allowed only where restrained joints cannot be used and when approved by Owner):

1. Placement:
  - a. Place concrete manhole block next to pipe and concrete reaction backing behind. Mega lugs and fitting bolts shall not be covered with concrete.
2. Bearing area: Provide the following square feet of concrete against trench wall in sand:

Pipe Size	Tees Plugs (Sft)	Hydrants 90° Els (Sft)	Wyes 45° Els (Sft)	22½° Els (Sft)	11¼° Els (Sft)
4"	2	1	1	1	1
6"	3	3	2	1	1
8"	4	6	3	2	1

10"	7	9	5	3	2
12"	9	11	6	3	2
14"	11	15	8	5	3
16"	13	20	10	6	3
18"	16	25	12	7	4
20"	20	28	14	8	4
24"	28	40	20	11	6

3. Other Soil Conditions:
  - a. Cement sand or hardpan: Multiply above by 0.5
  - b. Gravel: Multiply above by 0.7
  - c. Hard dry clay: Multiply above by 0.7
  - d. Soft clay: Multiply above by 2.0
  - e. Muck - secure all fittings with Megalug retainer glands or tie rod clamps and concrete reaction backing the same as listed for sand conditions.
  
- K. Repair sewer laterals disturbed during construction with PVC schedule 40 pipe and FERNCO fittings.
  
- L. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.

### 3.03 SANITARY AND STORM SEWER CROSSINGS:

- A. Applies to gravity flow sanitary sewer, forcemain, and gravity flow storm sewers.
  
- B. Minimum vertical distance measured from the outside of the water main pipe to the outside of the sewer pipe is 18".
  
- C. One full length of water main pipe shall be located so both joints are as far from the sewer as possible. This may require cutting the adjacent water main pipe to length, so the watermain crossing pipe is a full pipe length.

### 3.04 FIELD QUALITY CONTROL:

- A. Testing and Inspection:
  1. General:
    - a. Observation: By Owner or Owner's representative.
    - b. Completion: Before connecting to existing line.
    - c. Notification: Pretest and arrange for observation of test. Contractor to pay additional cost to witness retests.
    - d. Equipment and assistance: Provide.
    - e. Required water: By Owner where available from municipal system.
    - f. Connection to existing water main: After passing pressure and leakage tests, and bacteriological testing.
    - g. Meet requirements of AWWA C600 for ductile iron pipe, AWWA C605 for PVC pipe, AWWA M55 for HDPE pipe, and these specifications.
  2. Electrical continuity: Test ductile iron pipe for continuity and repair breaks.
  3. Pressure/Leakage Test:
    - a. Conditions: Air or air-water methods of applying pressure prohibited.
    - b. Sequence: Prior to Flushing and Chlorination.
    - c. Procedure: Fill system slowly, expel air through corporation stop at high points and apply pressure.

- d. Pressure: Maintain 150 psi.
- e. Duration: Two (2) hours.
- f. Make-up water: From measurable source.
- g. Leakage: Quantity of water supplied to maintain test pressure.
- h. Allowable: Less than:

$$L = \frac{SD \times \text{square root of } P}{148,000}$$

where,

L = leakage (gallons per hour).

S = length of pipe (feet).

D = nominal pipe diameter (inches).

P = average test pressure (pounds per square inch gauge).

- i. Correction: Repair defects and repeat test until acceptable.
  - j. Maximum length of pipe to be tested shall be 2000 feet.
4. Testing valves only: Maintain pressure on main and check all valves as follows:
- a. Vent extreme ends of main and briefly check each valve progressively back towards test point.
  - b. Allowable pressure drop shall be less than 10 psi in five (5) minutes with test pump off.
  - c. Correction: Repair defects and repeat test until acceptable.

### 3.05 FLUSHING:

- A. Flushing: Shall be performed in accordance with ANSI/AWWA C600, C605 & C651.
- 1. Sequence: Following pressure testing and prior to chlorination.
  - 2. Maximum intervals: 2,000 feet.
  - 3. Required water: By Owner where and when available from municipal system. Maintain minimum of 40 psi residual pressure in existing water system.
  - 4. Minimum velocity: 3.0 feet per second at pipe wall. See table below for size and number of taps or hydrant openings required to achieve minimum velocity:

<b>Required Flow &amp; Openings (either taps or hydrants) to Flush Pipelines at 3.0 ft/sec</b>						
Pipe Dia.	Flow required to produce ~3.0 ft/sec velocity in main (gpm)	Size of Tap Used			Number of Hydrant Outlets	
		Number of Taps Required on Pipe			2½"	4"
		1"	1½"	2"		
4"	120	1	1		1	1
6"	260		2		1	1
8"	470		3	2	1	1
10"	730			3	1	1
12"	1,060			5	2	1
16"	1,880				2	1

- B. The Contractor shall submit a procedure schedule outlining the method the Contractor proposes to use for flushing water mains. Utility owner shall be given notice by Contractor prior to any flushing.
- C. Flushing may be performed prior to pressure testing or following pressure testing, but in any case, prior to chlorination of the water main.

### 3.06 DISINFECTION:

- - A. Shall be performed in accordance with ANSI/AWWA C651 as modified by the Michigan Administrative Rules and herein.
    - 1. Continuous-Feed Method only.
      - a. Conducted by Contractor.
      - b. Observed by Owner or Owner's representative.
    - 2. Chlorine gas shall not be used nor is it allowed on-site.
    - 3. Potable water for disinfection provided by Owner where available from a municipal system. Contractor shall provide a suitable a cross-connection control device.
    - 4. Sequence:
      - a. Preliminary Flushing:
        - 1) Fill pipe and remove all air pockets.
        - 2) Flush pipe at 3 feet per second (fps) for 3 pipe volumes.
          - i. 6" pipe: 260 gpm is 3 fps.
          - ii. 8" pipe: 470 gpm is 3 fps.
          - iii. 10" pipe: 730 gpm is 3 fps.
          - iv. 12" pipe: 1,880 gpm is 3 fps.
        - 3) The above flushing requirements may be modified to fit site conditions at the discretion of the Owner's or Owner's representative.
      - b. Chlorination:
        - 1) Flow potable water and concentrated chlorine solution into the main at a constant rate to produce a chlorinated water solution of 25 mg/L chlorine throughout the length of the main.
        - 2) The chlorinated water solution shall be retained in the pipeline for 24-hours minimum during which time the valves and hydrants shall be operated to disinfect their parts.
        - 3) At the end of the 24-hour period, the chlorinated water solution shall have a chlorine concentration of not less than 10 mg/L.
      - c. Final Flushing:
        - 1) After the required 24-hour retention period, the heavily chlorinated water shall be flushed from the main and each branch.
        - 2) Flushing shall continue until the water in the main has a chlorine concentration no higher than the prevailing water system and acceptable for domestic use.
        - 3) Dechlorination of flushed water:
          - i. If there is any possibility the heavily chlorinated water will cause damage to the environment, a neutralizing chemical shall be applied to the water to thoroughly neutralize the residual chlorine in accordance with AWWA C655.
          - ii. Additionally, the Contractor must follow State & local standards.
      - d. Bacteriological Testing:
        - 1) After final flushing, samples shall be taken by Owner with assistance from the Contractor.
          - i. All laboratory fees shall be paid for by the Contractor.
          - ii. Owners time for resampling due to failed testing shall be paid for by the Contractor.
        - 2) Testing laboratory shall be certified for drinking water testing in the state of the project.
        - 3) Two sets of samples taken, the first taken after final flushing and the second not less than 24-hours after the first. Both sets of samples must pass.
        - 4) Each set of samples includes one sample from every 1,200' of main including one at each end of the pipeline and one at the end of each branch greater than 20' long.

- B. Disinfection report; record:
  - 1. Type and form of disinfectant used.
  - 2. Date and time of disinfectant injection start and time of completion.
  - 3. Test locations.
  - 4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
  - 5. Date and time of flushing start and completion.
  - 6. Disinfectant residual after flushing in ppm for each outlet tested.
  
- C. Bacteriological report record:
  - 1. Date issued, project name, and testing lab name, address, and telephone number.
  - 2. Time and date of water sample collection.
  - 3. Name of person collecting samples.
  - 4. Test locations.
  - 5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
  - 6. Coliform bacteria test results for each outlet tested.
  - 7. Certification that water conforms, or fails to conform, to bacterial standards.
  - 8. Bacteriologist's signature and authority.
  
- D. Final Connections to Existing Mains:
  - 1. Each connection must be less than 20' long or additional disinfection procedures will be required.
  - 2. All interior surfaces of pipes, fittings, valves, etc...that may come into contact with potable water shall be swabbed or sprayed with a minimum 1% chlorine solution just before assembly.

**END OF SECTION**

## SECTION 33 31 00

### SANITARY SEWERS

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes work required for sanitary sewers, structures and appurtenant work.

##### 1.02 REFERENCES:

- A. ASTM – American Society of Testing Materials, latest edition.
- B. NCPI - National Clay Pipe Institute.

##### 1.03 SUBMITTALS:

- A. Pre-Construction:
  - 1. Individual Manhole Build Sheets:
    - a. Top, bottom and invert elevations.
    - b. Pipe orientation.
    - c. Individual precast concrete section dimensions.
    - d. Prefabricated rubber boot material & manufacturer.
  - 2. Castings:
    - a. Manufacturer & model numbers.
  - 3. Pipe & Fittings:
    - a. Manufacturer, material & ASTM designation.
    - b. Joint construction details.
- B. Post Construction:
  - 1. Witnesses:
    - a. Three witness measurements to end of laterals from permanent fixtures such as building corners.
    - b. Measurement from lateral wyes to nearest downstream manhole.
    - c. Invert elevation at end of each lateral.

##### 1.04 JOB CONDITIONS:

- A. Maintain existing sanitary sewer system operational. At new connections to the existing sewer system, plug the downstream end of the new sewer until the new sewer has been tested and accepted.
- B. Do not bypass wastewater to ground or surface waters.
- C. Install service lines as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- D. Clean up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation. Clean-up includes backfill and rough grading.

**PART 2 - PRODUCTS**

2.01 PIPE:

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**NOTE TO SPECIFIER:**

1. Select type of pipe for the project and delete those not allowed.
2. If clay is used at depths over 10 feet, design a class "A" bedding, concrete bedding or concrete arch.
3. For all pipe types laid at depths over 19 feet, Engineer should design pipe class and bedding.
4. For depths less than 5 feet, specify and design additional cover or insulation.

\*\*\*\*\*

A. Classification Table:

Type and Size	Design Depth (feet)		
	0' - 10'	10' - 19'	Over 19'
Plastic (PVC) 8" - 15"	ASTM D3034-SDR35	ASTM D3034-SDR35	ASTM D3034-SDR26 (with SDR35 O.D.)
Plastic (PVC) 18" & larger	ASTM F679 Solid Wall	ASTM F679 Solid Wall	ASTM F679 Solid Wall
Plastic (PVC) 4" - 6"	ASTM D3034-SDR35	ASTM D3034-SDR35	ASTM D3034-SDR26 (with SDR35 O.D.)
Plastic (ABS) 4" - 6"	ASTM D1527 Schedule 80	ASTM D1527 Schedule 80	ASTM D1527 Schedule 80
Plastic (PE) 4" - 6"	ASTM D2239-SDR15 Series 60	ASTM D2239-SDR11.5 Series 80	ASTM D2249-SDR9 Series 100

B. Concrete Pipe: Provide circular reinforcing, wall B.

C. Service Pipe and Fittings: Provide minimum 6-inch, same classification as mainline pipe.  
 1. Plastic (PVC) ASTM D3034 – SDR 35 or 26, or plastic truss (ABS) ASTM D2680.

D. Plastic Pipe: Provide seating marks where couplings are used for jointing.  
 1. joints: Provide rubber "O" ring.

E. Joint Repair or Connecting to Existing Sewer Pipe of Different Material:  
 1. Provide Fernco adapter coupling and stainless-steel bands.

F. Provide Joint Materials as Indicated for the following Pipes:  
 1. Clay: ASTM C425.  
 2. Concrete: ASTM C443.  
 3. Plastic truss (ABS): ASTM D2680.

4. Plastic (ABS): ASTM D1527.
5. Plastic (PE): ASTM D2239.
6. Plastic (PVC): ASTM D3212 or ASTM F679 (18" & larger).

## 2.02 MANHOLES

- A. Manholes shall be precast units.
- B. Precast Units: ASTM C478 with circular reinforcement, modified for "O" ring gaskets.
  1. Pipe Openings: Provide flexible, watertight rubber boot using mechanically compressed flexible joint re-seal, link-seal, Pressure Wedge, Kor-N-Seal or equal. Conform to ASTM C923.
- C. Concrete: 3500 psi 28-day, 4-inch maximum slump.
- D. Concrete Brick: ASTM C55, Grade N-1.
- E. Grade Rings: ASTM C478 with "O" ring gaskets or ASTM D4976 HDPE adjusting rings with butyl sealant manufactured by Ladtech, Inc. or equal.
- F. Mortar: ASTM C270: 1-part Portland cement, 1-part lime and 3 parts sand by volume.
- G. Manhole Steps:
  1. Polypropylene encapsulated steel.
  2. Dimensions: 10-inches wide, 4-inch minimum clear tread depth, spaced 16 inches apart.
  3. Steps shall be in accordance with:
    - a. ASTM C 478
    - b. ASTM D 4101 (polypropylene)
    - c. ASTM A 615 (steel)
- H. Sanitary manhole casting: East Jordan 1045Z1 A cover or Neenah R-1642, solid lid; with letter S.
- I. Watertight Manhole Castings (bolted and gasketed): East Jordan 1045ZPT 1040APT 4-bolt Sanitary Sewer Assembly or Neenah R-1916 F with watertight assembly; with letter S.
- J. Cement Waterproofing: Masonry filler.
- K. Pipe Insulation: Closed cell extruded polystyrene 2-inch-thick rigid board manufactured by Dow, Owens Corning or approved equal.
- L. Drop pipe diameter:
  1. 8" diameter for incoming pipe sizes 8" through 12".
  2. 10" diameter for incoming pipe sizes 15" through 18".
  3. 12" diameter for incoming pipe sizes 21" through 27".
  4. 15" diameter for incoming pipe sizes 30" through 36".



## PART 3 - EXECUTION

### 3.01 PREPARATION:

- A. Alignment and Grade:
  - 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the plans.
  - 2. Laser Beam Control: Provide.
  - 3. Check grade: At set-up point, 25-foot, 50-foot, 100 foot and 200-foot points thereafter to the next set-up point.
  - 4. Projector advancement: Reset at each manhole.
- B. Bedding:
  - 1. Method: See *Methods of Bedding Gravity Pipe* detail.
  - 2. Provide bedding area backfill as specified elsewhere.
  - 3. Provide continuous bearing by supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.

### 3.02 INSTALLATION:

- A. Laying pipe:
  - 1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
  - 2. Joints shall be smooth and clean.
  - 3. Place pipe length and bedding as a unit in a frost free, dry trench.
  - 4. Install PVC pipe in accordance with ASTM 2321 and these specifications.
  - 5. Install reinforced concrete pipe in accordance with ASTM D 1479 except as exceeded by these specifications.
- B. Jointing:
  - 1. Provide solvents, adhesives and lubricants as furnished by Manufacturer.
  - 2. Gasket position: Confirm that the gasket is in place and that the joint is properly made.
- C. Manholes:
  - 1. Fill joint space completely and trowel between sections of precast units.
  - 2. Provide casting grade setting as follows:
    - a. Existing pavement: Finished grade.
    - b. Gravel or lawn grade: 4 inches below.
    - c. Unpaved areas: Finished grade.
  - 3. Flow channels:
    - a. Construct with concrete up to the top of pipe and slope benches toward center of manhole. Trowel smooth.
    - b. Provide clean, smooth, straight flow channels for main line and laterals.
    - c. Provide smooth curvilinear flow channels for turning flows.
  - 4. Casting adjustment: Concrete ring between leveling and top course of bituminous. Match cross slope of top of casting to cross slope of pavement.
  - 5. All sanitary sewer laterals, sewer main, service connections and drop manhole pipes shall have flow channels and shall not discharge onto the surface of the bench. Outside drop connection are required for drop of 2 feet or more.
- D. Abandoning and filling existing sanitary sewer and manholes:
  - 1. Pipe: Plug ends of pipe to be abandoned and fill completely with flowable fill.
  - 2. Manhole: Remove top 3 feet of manhole, plug pipe openings and fill manhole to be abandoned with flowable fill.

- E. Connections:
1. Expose existing sanitary sewer and structures to which the new work is to be connected to confirm condition, location and elevation.
  2. Connect to existing sanitary manhole by coring an opening adequate to connect the proposed pipe with a flexible rubber boot to form a watertight connection.
    - a. Relay and repoint loose blocks and bricks on existing block and brick structures. Rechannel flowlines and benches with concrete, trowel smooth.
  3. Future Sanitary Sewer: Provide the following:
    - a. Plug: Pipe 4 inch through 21 inches with standard disc.
    - b. Bulkhead: Pipe 24 inch and larger with brick and mortar and ½ inch plaster coat outside.
      - 1) 24 inch - 36 inch: 4 inches thick.
      - 2) 42 inch - 60 inch: 8 inches thick.
- F. Service Lines:
1. Align at right angles to street or easement line.
  2. Grade: Provide at uniform rate from mainline wye or riser to the property or easement line, at minimum grade 1/4 inch per foot.
  3. Provide minimum depth at street right-of-way line, property line or easement line as follows (based on house with 8-foot ceiling height in basement, length on private property of 100 feet, and minimum grade on private property of 1/8 inch per foot):
    - a. House with basement: 12 feet below first floor elevation or 3 feet below basement elevation, whichever is deeper.
    - b. Commercial and industrial buildings, schools, churches: Confirm required depth with facility owner.
    - c. The above depths govern, except that the minimum depth at the right-of-way line or property line shall be 6 feet below street or easement centerline grade.
    - d. Property line riser excluded from the above minimum depths.
    - e. The minimum depths shown above shall be increased based on actual basement ceiling height and distance away.
  4. Connection fitting:
    - a. Locate in field.
    - b. 45° or 60° Wyes: Provide on all pipe except concrete pipe.
    - c. Tees: Allowed only on reinforced concrete pipe.
  5. Main riser will be allowed where cover exceeds 13 feet at mainline.
  6. Plugging: Provide standard plugs or caps securely blocked.
  7. Markers: Place a wood marker (2" x 2" minimum) at end of lateral with sufficient length to extend from invert of lateral to ground surface. Attach a steel rerod 36 inches in length immediately next to the wood marker with the top of the rerod 2 inches below grade. Cover wood marker and steel rerod with 6' long 4" PVC pipe buried 3 feet.
  8. Witnesses: Report the following:
    - a. Wyes or Tees: Measurements to nearest downstream manhole.
    - b. End of Laterals: Three (3) measurements to permanent surface features and elevation.
  9. Property line Riser: Required on all laterals.
- G. Bypass Pumping: Provide temporary bypass pumping of wastewater flow as required during construction or replacement of sanitary sewer.
- H. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.

### 3.03 WATER MAIN CROSSINGS:

- A. Minimum vertical distance measured from the outside of the water main pipe to the outside of the sewer pipe is 18".
- B. One full length of sewer pipe shall be located so both joints are as far from the water main as possible. This may require cutting the adjacent sewer pipe to length, so the sewer crossing pipe is a full pipe length.

#### 3.04 TESTING AND INSPECTION:

- A. General:
  - 1. Observation: By Owner or Owner's representative.
  - 2. Testing: Perform upon completion and before connecting to active system.
  - 3. Leakage tests: Provide promptly following installation of sewer pipe including services and keep within maximum 1200 feet behind pipe laying operation.
  - 4. Notification: Clean, pretest and arrange with Owner or Owner's representative for final inspection and test.
  - 5. Provide necessary equipment, manpower and assistance.
  - 6. Video televising: Provide prior to paving.
- B. Line and Grade: Allowable drift between structures from proposed alignment will be as follows:
  - 1. Line:
    - a. Through 36 inches: 0.20 foot.
    - b. Over 36 inches: 0.40 foot.
  - 2. Grade:
    - a. Through 36 inches: 0.02 foot.
    - b. Over 36 inches: 0.05 foot.
    - c. Allowable sag between pipe joints: 5% of pipe diameter with maximum of 1-inch.
  - 3. Repair sags in excess of tolerance prior to acceptance (required only if video televising indicates a problem).
- C. Plastic pipe deformation:
  - 1. Pipe deformation will be limited to five percent (5%) of diameter.
  - 2. Pull GO, NO-GO type gauge through pipe by hand.
  - 3. Contractor shall provide proof ring for GO, NO-GO gauge from the manufacturer.
  - 4. Schedule: Conduct after final backfill has been in place a minimum of thirty (30) days, and after shutdown of dewatering operation.
  - 5. Correction: Repair defects and retest until acceptable.
- D. Video Televising:
  - 1. Contractor shall complete video televising of new sewers prior to acceptance
  - 2. The sewers and manholes to be televised shall be cleaned completely free of debris prior to televising.
  - 3. Contractor shall provide to Owner or Owner's representative.
- E. Leakage Testing:
  - 1. Contractor to perform exfiltration (water or air) test unless ground water is present, in which case Contractor may opt to perform infiltration test.
  - 2. Acceptable leakage will be as follows:
    - a. Water: Less than 100 gallons per inch of pipe diameter per mile of pipe per twenty-four (24) hours.
    - b. Air: Holding time not less than that listed in table.
  - 3. Correction: Repair defects and repeat test until acceptable.

- a. Method of repairing defects shall be approved by Owner or Owner's representative.

F. Infiltration Test (water):

- 1. Conditions: Minimum groundwater depth 2 feet above high point of system under test.
- 2. Procedure:
  - a. Install and maintain "V" notch weir at low end of system under test.
  - b. Leakage: Quantity of water measured by "V" notch weir.

G. Exfiltration Test (water):

- 1. Conditions: Determine groundwater elevation.
- 2. Procedure:
  - a. Fill system minimum 2 feet above high point of system or 2 feet above groundwater, whichever is higher.
  - b. Leakage: Quantity of water required to maintain constant level.

H. Exfiltration (air): Perform in accordance with NCPI Publication, "Low Pressure Air Test for Sanitary sewers", and in accordance with ASTM F 1417, "Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air".

- 1. Condition: Determine groundwater elevation.
- 2. Procedure:
  - a. All pressure readings are above the average groundwater head.

3.05 ADJUST AND CLEAN:

A. General:

- 1. Keep pipe and structures clean as work progresses.

3.06 SCHEDULES:

A. Exfiltration Air Test Table.

B. Manhole Final Inspection Punch List.

**END OF SECTION**

### EXFILTRATION AIR TEST

Time Required for Loss of Pressure from 3.5 PSIG to 3.0 PSIG for Size and Length of Pipe indicated for Q = 0.0015 (Cu. Ft./Min./Sq.Ft. of Internal Surface Area)

Pipe Diameter (in.)	Minimum Time min; sec.	Length for Min. Time (ft.)	Time for Longer length (sec.)	Specification Time for Length (L) Shown (min:sec)											
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	500 ft	550 ft	600 ft	
4	1:53	597	.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:54
6	2:50	398	.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12	3:34	3:55	4:16	
8	3:47	298	.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42	6:20	6:58	7:36	
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54	9:54	10:53	11:52	
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:48	11:24	12:50	14:15	15:40	17:06	
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02	22:16	24:29	26:43	
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51	32:03	35:16	38:28	
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16	43:37	47:59	52:21	
24	11:20	99	6.837L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17	56:59	62:41	68:23	
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54	72:07	79:20	86:33	
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07	89:02	97:56	106:51	
33	15:35	72	12.926L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57	107:44	118:31	129:17	
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23	128:13	141:02	153:51	
39	18:25	61	18.054L	30:57	45:09	60:11	75:14	90:16	105:19	120:22	135:24	160:32	165:31	180:34	
42	19:50	57	20.939L	34:54	52:21	69:48	87:15	104:42	122:09	139:37	157:03	174:31	191:58	209:25	

Note: When 2 sizes of pipe are involved, the time shall be computed by the ratio of lengths involved.

Example: 400 feet of 10-inch pipe and 200 feet of 6-inch pipe

$$\text{Time} = \frac{\text{Length}(1) \times \text{Time}(1) + \text{Length}(2) \times \text{Time}(2)}{\text{Length}(1) + \text{Length}(2)} = \frac{400 \times 7:54 + 200 \times 2:50}{400 + 200} = \frac{400 \times 474 + 200 \times 170}{400 + 200} = 373 \text{ seconds} = \mathbf{6:13 \text{ (min:sec)}}$$

### **MANHOLE FINAL INSPECTION PUNCH LIST**

- Verify specification for correct casting
- Record depth of all inverts to top of casting.
- Verify chimney adjustment rings are completely cemented in place and plaster coated.
- Verify casting is centered in the opening and completely cemented in place with no voids between casting and top of chimney. (check maximum dimensions – see Manhole Detail)
- Cement lift holes and all penetrations.
- Verify pipe penetrations are properly sealed.
- Flow lines are completed and smooth with no high or low spots.
- Flow line is poured up to spring line or ½ the diameter of pipe.
- Benches sloped to flow line at 1” per foot minimum.
- All voids in walls and bottom are cemented.
- Manhole steps and bottom are clean of concrete, bituminous, dirt, debris, etc.
- Verify slope is correct from proposed upstream to down stream inverts.
- Drainage structure constructed of blocks or bricks is plaster coated inside and outside of entire structure.
- Verify catch basin sumps are clean.
- Casting has been properly adjusted prior to final top course. (check tilt to match pavement cross slope)
- Final inspection completed before final top course of asphalt is laid.

### **RECOMMENDED SAFETY CHECK LIST (may not be all-inclusive)**

1. Use vehicle to protect yourself from traffic.
2. Use construction cones on street with traffic (4 minimum)
3. Always wear reflectorized safety vest.
4. Follow Confined Space Entry Procedures if entering a manhole.



## SECTION 33 41 00

### STORM SEWERS

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes work required for storm sewers, culverts, structures, under drains, drain excavation/cleanout and related work.

##### 1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "2020 Standard Specifications for Construction".
- B. ASTM - American Society of Testing Materials, latest edition.

##### 1.03 SUBMITTALS:

- A. Pre-Construction:
  - 1. Individual Drainage Structure Build Sheets:
    - a. Top, bottom and invert elevations.
    - b. Pipe orientation.
    - c. Individual precast concrete section dimensions.
    - d. Prefabricated rubber boot material & manufacturer.
  - 2. Castings:
    - a. Manufacturer & model numbers.
  - 3. Pipe & Fittings:
    - a. Manufacturer, material & ASTM designation.
    - b. Joint construction details.
  - 4. Geotextile Fabric:
    - a. Manufacturer, material & ASTM designation.
- B. Post Construction:
  - 1. Witnesses:
    - a. Three witness measurements to blind taps and lateral ends from permanent fixtures such as building corners.
    - b. Invert elevation at end of each lateral.

##### 1.04 JOB CONDITIONS:

- A. Maintain existing storm sewer operational.
- B. Install service lines, catch basins and inlet leads as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- C. Clean up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation. Clean-up includes backfill and rough grade.



## **PART 2 - PRODUCTS**

### **2.01 PIPE:**

- A. Polyethylene (PE): MDOT 909.06.
  - a. Manufacturers: ADS N-12 or Hi-Q.
- B. Footing Drains: PVC pipe, ASTM D3034 SDR35, or match existing pipe material.
- C. Under drains: MDOT 909.07 with geotextile sock.

### **2.02 PREMIUM JOINTS:**

- A. Concrete: ASTM C443, modified to include "O" rings on grooved pipe ends.
- B. Plastic: Rubber O-Rings.

### **2.03 MANHOLES, CATCH BASINS AND INLETS:**

- A. Precast Units: ASTM C478.
  - 1. Joints: Cement mortar, preformed bituminous rope or "O" ring gaskets.
  - 2. Pipe openings: Pipe diameter plus 6 inches, maximum.
- B. Concrete Radial Units: ASTM C139.
- C. Grade Rings: ASTM C478 with "O" ring gaskets or ASTM D4976 HDPE adjusting rings with butyl sealant manufactured by Ladtech, Inc. or equal.
- D. Manhole Steps:
  - 1. Polypropylene encapsulated steel.
  - 2. Dimensions: 10-inches wide, 4-inch minimum clear tread depth, spaced 16 inches apart.
  - 3. Steps shall be in accordance with:
    - a. ASTM C 478
    - b. ASTM D 4101 (polypropylene)
    - c. ASTM A 615 (steel)
- E. Manhole Castings: East Jordan 1045Z1, B cover or Neenah R-1733, vented lid.
- F. Catch Basin and Inlet Castings: MDOT C, E OR K as follows:
  - 1. Concrete rolled curb and gutter: Cover C.
  - 2. Bituminous valley gutter: Cover C.
  - 3. Ditch centerline: Cover E.
  - 4. Concrete standard curb and gutter: Cover K. Cover KK where called for on plans. Cover KK shall be East Jordan Iron Works #7030 T1 or T3, Neenah Grate r-3246 or equal.
  - 5. Concrete gutter pan within influence of ADA sidewalk ramp: EJIW 5100 with 5105 M3 ADA grate, or approved equal.
  - 6. Catch basin backs / grates shall be marked with lettering "DUMP NO WASTE, DRAINS TO WATERWAYS".

### **2.04 RIPRAP:**

- A. Riprap: MDOT 916.01.C.

- B. Geotextile Fabric: MDOT 910.03.B and Table 910-1.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION:**

- A. Alignment and Grade:
  - 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the drawings.
  - 2. Expose existing utilities at crossings of proposed storm sewer in advance of laying pipe to verify existing depth. Advise Engineer of conflicts in grade and provide adjustments in grade of storm sewer at no additional cost.
- B. Laser Beam Control:
  - 1. Check grade at set-up point, 25-foot, 50-foot, 100 foot and 200-foot points thereafter to the next set-up point.
  - 2. Projector advancement: Reset at each manhole.
- C. Bedding:
  - 1. See *Methods of Bedding Gravity Pipe* detail.
  - 2. Provide bedding area backfill as specified elsewhere.
  - 3. Provide continuous bearing by supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.

#### **3.02 INSTALLATION:**

- A. Laying pipe:
  - 1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
  - 2. Joints shall be smooth and clean.
  - 3. Place pipe length and bedding as a unit in a frost free, dry trench.
  - 4. Install reinforced concrete pipe in accordance with ASTM D 1479 except as exceeded by these specifications.
  - 5. Footing drains and under drains shall have 4'-0" minimum cover.
- B. Jointing:
  - 1. Premium:
    - a. Solvents, adhesives and lubricants shall be furnished by Manufacturer.
    - b. Seating: Fully.
    - c. Gasket position: Check.
- C. Manhole, Catch Basins and Inlets:
  - 1. Base bedding: Provide 4-inch pea stone with full and even bearing in impervious or wet conditions. Otherwise provide on undisturbed frost-free dry subgrade.
  - 2. Precast: Fill joint space completely and trowel.
  - 3. Block: Set in full bed of mortar with key slots filled, joints maximum ½ inch at inside face and wipe joints. Plaster coat complete interior of structure with ½ inch coat of cement mortar.
  - 4. Provide manhole casting grade setting as follows:
    - a. Existing pavement: Finish grade.
    - b. Gravel or lawn grade: 4 inches below.
    - c. Unpaved areas: Finished grade.

5. Provide catch basin casting grade setting as follows:
  - a. Gutter grade: ½ inch below.
  - b. Unpaved areas: 6 inches below finished grade.
6. Manhole casting adjustment: Concrete ring between leveling and top course of bituminous. Match cross slope of top of casting to cross slope of pavement.
  - a. HDPE adjusting rings:
    - 1) Install per manufacturer's recommendations.
    - 2) Seal to manhole structure, casting and to one another by means of an approved butyl sealant.
    - 3) Adjustment for matching road grade and/or cross slope shall be made utilizing a molded and indexed slope ring.
7. Flow Channels:
  - a. Not Required.

D. Riprap: MDOT 813.03.E.

E. Connections:

1. Expose existing storm sewer and structures to which the work is to be connected to confirm condition, location and elevation.
2. Connect to existing storm manhole by coring or jack hammering opening adequate to insert pipe and secure circumference of pipe with non-shrink cement mortar.
  - a. Relay and repoint loose blocks and bricks on existing block and brick structures.
  - b. Rechannel flowlines and benches with concrete, trowel smooth.
3. Future Storm Sewer:
  - a. Plug: Pipe 4 inch through 21 inches with standard disc.
  - b. Bulkhead: Pipe 24 inch and larger with brick and mortar, ½ inch plaster outside.
    - 1) 24 inch - 36 inch: 4 inches thick.
    - 2) 42 inch - 60 inch: 8 inches thick.
    - 3) 60 inch and larger: 12 inches thick.

F. Under drains: MDOT Section 404.

1. Connect to downstream storm manholes.

G. Footing Drains:

1. Connect to edge drain (under drain) or directly to catch basin. Connections to the mainline storm sewer will not be allowed.

H. Drain Excavation/Cleanout:

1. Section: 4-foot flat bottom with 1 on 2 maximum side slopes.
2. Remove trees and brush as required, unless otherwise indicated.
3. Excess excavated material:
  - a. Drain excavation of 2 feet or less: Spread, level and grade to drain along top of banks.
  - b. Drain excavation in excess of 2 feet: Remove from site and place in an upland disposal site.

### 3.03 TESTING AND INSPECTION:

A. General:

1. Observation: By Owner or Owner's representative.
2. Completion: Before connecting to active system.
3. Notification: Clean and arrange for inspection.

- B. Line and Grade: Allowable drift between structures from proposed alignment will be as follows:
    - 1. Line:
      - a. Through 36 inches: 0.40 foot.
      - b. Over 36 inches: 0.80 foot.
    - 2. Grade:
      - a. Through 36 inches: 0.05 foot.
      - b. Over 36 inches: 0.10 foot.
- 3.04 ADJUST AND CLEAN:
- A. General:
    - 1. Keep pipe and structures clean as work progresses.

**END OF SECTION**

