Bullock Creek School District

PROJECT MANUAL



Bullock Creek School District

2024 Bond Series 2
2027 Improvements

October 29, 2026

ARCHITECTS/ENGINEERS
THA Architects/Engineers
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Flint, MI 48503
Telephone: 810-767-5600
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THA Architects Engineers
817 E. Kearsley St. | Flint, MI 48503
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CONSTRUCTION MANAGER
Wolgast Corporation
4835 Towne Centre Road, Suite 203
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Wolgast CORPORATION

Bidding Requirements, Contract Forms, and Conditions of the Contract

00005 – Index
00010 – Notice to Bidders
00100 – Instructions to Bidders
00300 – Instructions – Proposals/Bid Division Descriptions
00305 – Proposal Form
00306 – Familial Relationship Affidavit
00307 – Iran Business Relationship Affidavit
00309 – Bid Division Descriptions
00310 – Clarification Request Form
00410 – Bid Security
00500 – Notice to Proceed/Commencement of Work
00510 – Sample Owner/Contractor Agreement
00600 – Bonds
00650 – Certificates of Insurance/Sample Form
00670 – Schedule of Values
00680 – Subcontractor, Supplier, Material, Equipment
00690 – Employee Listing
00700 – General Conditions of the Contract for Construction – AIA A232
00900 – Addenda
00999 – Milestone Schedule

Division 1 – General Requirements

01010 – Summary of Work
01030 – Project Work Hours
01040 – Project Administration
01045 – Contractor Applications for Payment
01050 – Sworn Statements/Waivers
01051 – Change Events
01053 – Change Orders
01055 – Field Engineering
01060 – Prevailing Wage
01085 – Applicable Standards
01100 – Alternates
01200 – Project Meetings
01300 – Submittals
01350 – Schedules
01400 – Quality Control
01410 – Testing Services
01510 – Temporary Utilities
01520 – Construction Aids
01530 – Safety
01540 – Security
01550 – Access and Deliveries
01560 – Temporary Controls
01570 – Traffic Regulation
01580 – Project Informational Signs
01590 – Project Field Office
01600 – Material and Equipment
01700 – Contract Closeout
01710 – Cleaning
01720 – Record Documents
01730 – Operating and Maintenance Data
01740 – Guaranties and Warranties
01800 – Hazardous Materials Affidavit of Non-Use
01805 – AHERA Notification
01900 – Demolition and Removal

END OF SECTION 00005

Bullock Creek School District will receive sealed bid proposals for construction trade work from qualified contractors for the **Bullock Creek School District, 2024 Bond Series 2 - 2027 Improvements.**

A pre-bid meeting and project walk-through will be conducted by the Construction Manager, Wolgast Corporation, and the Architect, **THA Architects/Engineers**, on

Wednesday, November 4th - Floyd Elementary at 4:30pm
Thursday, November 5th – Middle School at 2:40pm
Pine River Elementary at 3:40pm
High School at 4:45pm

Meet at the **Front Entrance of Each Building.**

Proposals may be mailed or delivered in person to **Shawn Hale, Superintendent**, c/o **Bullock Creek School District 1420 S Badour Road, Midland, MI 48640**. Proposals must be received prior to **1:00 PM** (local time) on **November 23, 2026**, at the **Bullock Creek School District Administration Building.**

Proposals will be publicly/Virtually opened and read aloud at **1:15pm** in the **High School Cafeteria. Electronic Sealed bids must be submitted using Building Connected see below link.** https://app.buildingconnected.com/login?retUrl=%2F All bids will be evaluated after the bid opening. All bids received after **1:00 PM** of the bid date will be returned to the Bidder unopened.

If you would like to listen in while the bids are being opened, please use this TEAMS link:
https://teams.microsoft.com/meet/218136780911571?p=Y7r1jYpVycrEjOEdvx
Meeting ID: 218 136 780 911 571 5 Passcode: Ja9G8wk3

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 on or about **December 21, 2026,** 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. One (1) set of Bidding Documents will be provided to each contractor at No Cost for electronic documents through Wolgast Corporation. Plans may be obtained from Wolgast Corporation, attention **Lisa Donahue ldonahue@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 **Jason McDonald jmcdonald@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: **Bullock Creek School District.**

B. The Architect is: **THA Architects/Engineers.**

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: **Bullock Creek School District, 2024 Bond Series 2 - 2027 Improvements**

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:

Jason McDonald, Project Manager, Wolgast Corporation, (989) 790-9120, extension **712** or **jmcdonald@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 is 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

Front Entrance of Each Building

November 4th - Floyd Elementary at 4:30pm – 725 S 8 Mile Road, Midland, MI 48640

November 5th - Middle School at 2:40pm – 644 S Badour Road, Midland, MI 48640
Pine River Elementary at 3:40pm – 1894 E Pine River Road, Midland, MI 48640
High School at 4:45pm – 1420 S Badour Road, Midland, MI 48640

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 bid 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 a 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

1.16

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. Proposals shall be submitted to:

Bullock Creek School District
Shawn Hale, Superintendent
1420 S Badour Road
Midland, MI 48640

Electronic Sealed bids must be submitted using Building Connected see below link.
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.)

If you want to listen in while the bids are being opened, please use this TEAMS link
https://teams.microsoft.com/meet/2181367809115715?p=Y7r1jYpVycrEjOEdvx
Meeting ID: 218 136 780 911 571 5 Passcode: Ja9G8wk3

Proposals shall be submitted by **1:00 PM** on **November 23, 2026**.
(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

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 and bid bond, on the Proposal Form – Section 00305.**
2. Alternate Pricing forms (if applicable to this Project).

C. Each Proposal should 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 on.

B. Each Bidder is required to include a separate Bid for each Bid Division in order to be considered for a 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 a 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:**

TO: **Bullock Creek School District**
Attn: Shawn Hale
1420 S Badour Road
Midland, MI 48640

SEALED BID FOR:

Bullock Creek School District
2024 Bond Series 2 - 2027 Improvements

Bid Division No:_____

END OF SECTION 00300

Project: **Bullock Creek School District**
2024 Bond Series 2 - 2027 Improvements
Middle School only

Submitted By: _____
(Bidder's Company Name)

Address: _____

City / State / Zip: _____

Phone: _____

Contact Name: _____

Email: _____

Bid Proposal Deadline: **Prior to November 23, 2026 at 1:00 PM (local time) to:**

Bullock Creek School District
Shawn Hale, Superintendent,
1420 S Badour Road
Midland, MI 48640.

Electronic Sealed bids must be submitted using Building Connected see below link.
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 Bullock Creek School District - 24 BD Series 2 - MS (not including Labor Bond, Material Bond, and/or Performance Bond Costs):

_____ Dollars and 00/100ths

$ _____

BOND COST for Bullock Creek School District -24 BD Series 2 - MS (Cost to provide Labor Bond, Material Bond, and/or Performance Bonds on Base Bid):

_____ Dollars and 00/100ths

$ _____

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 Bid Divisions involved.

Bid Divisions Combined	Deduct from each Bid Division:
_____	_____
_____	_____
_____	_____
_____	_____

ALTERNATES

Alternate 1 – MS – ADD – Include lighting replacement in storage rooms adjacent to classrooms and lighting replacement in the office area.

Alt 1 - ADD _____

Alt 1 - BOND _____

Alternate 2 – MS – ADD – Remove and replace existing lockers in lieu of painting existing lockers.

Alt 2 - ADD _____

Alt 2 - BOND _____

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:

Item(s)	Manufacturer/Subcontractor/Supplier

VOLUNTARY ALTERNATES / VALUE ENGINEERING SUGGESTIONS

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

Summary of Suggestions	Deduct from Base Bid

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 **Refer to Milestone Schedule.**

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

END OF SECTION 00307

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

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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.

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END OF SECTION 00307

Project: **Bullock Creek School District**
2024 Bond Series 2 - 2027 Improvements
HS, Pine River Elem and Floyd Elem

Submitted By: _____
(Bidder's Company Name)

Address: _____

City / State / Zip: _____

Phone: _____

Contact Name: _____

Email: _____

Bid Proposal Deadline: **Prior to November 23, 2026 at 1:00 PM (local time) to:**

Bullock Creek School District
Shawn Hale, Superintendent,
1420 S Badour Road
Midland, MI 48640.

Electronic Sealed bids must be submitted using Building Connected see below link.
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 Bullock Creek SD - 24 BD Series 2 – HS, PR, FLD (not including Labor Bond, Material Bond, and/or Performance Bond Costs):

_____ Dollars and 00/100ths

$ _____

BOND COST for Bullock Creek SD - 24 BD Series 2 – HS, PR, FLD (Cost to provide Labor Bond, Material Bond, and/or Performance Bonds on Base Bid):

_____ Dollars and 00/100ths

$ _____

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 Bid Divisions involved.

Bid Divisions Combined	Deduct from each Bid Division:
_____	_____
_____	_____
_____	_____
_____	_____

BUILDING BREAKDOWN

Building	Base Bid	Bond	Alternate	TOTAL
High School				
Pine River Elementary				
Floyd Elementary				
TOTAL				

ALTERNATES

Alternate 1 – Floyd Elem – ADD – Sand and repaint existing lockers in east classroom wing.

Alt 1 - ADD _____

Alt 1 - BOND _____

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:

Item(s)	Manufacturer/Subcontractor/Supplier

VOLUNTARY ALTERNATES / VALUE ENGINEERING SUGGESTIONS

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

Summary of Suggestions	Deduct from Base Bid

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 **Refer to Milestone Schedule.**

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

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_____ _____
Signature Title

_____ _____
Company Date

END OF SECTION 00307

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.

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(*ii*) A loan or other extension of credit.

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

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(*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.

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(*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.

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(*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).

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(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.

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

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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.

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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.

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END OF SECTION 00307

Bid Division: 060000 – General Trades

Bid to Include:

Total Responsibility for Specification Sections:

Section 024100 – Demolition
Section 033000 – Cast-in-Place Concrete
Section 042000 – Unit Masonry
Section 061000 – Rough Carpentry
Section 062000 – Finish Carpentry
Section 081213 – Hollow Metal Frames
Section 081416 – Flush Wood Doors
Section 087100 – Door Hardware
Section 087101 – Door Hardware Schedule
Section 090561 – Existing flooring removal and preparation
Section 096500 – Resilient Flooring
Section 096700 – Resinous Floor Coating
Section 097800 – Interior Wall Paneling
Section 102113.19 – Plastic Toilet Compartments
Section 102800 – Toilet, Bath, and Laundry Accessories

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 078413 – Penetration Firestopping (As it relates to work in this Bid Division)
Section 329218 – Lawn restoration (As it relates to work in this Bid Division)

Excludes:

1. All demolition of conduits, ducts, pipes, fixtures, etc. (demolition required for all mechanical, plumbing, and electrical work) is to be performed by specific mechanical, plumbing, and electrical contractors.
2. Removal of any material with asbestos to be done by a third-party contractor before the construction project begins.

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.

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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 two (2) weeks of Construction Contract or Owner's Letter of Intent.
7. Responsible for all building demolition. (Please review all Bid Divisions so as not to overlap work).

Bid Division: 060000 – General Trades

8. Demolition package includes but is not limited to the following:
    a. All selective building demolition
    b. All drywall, masonry or other walls
    c. Ceilings
    d. Flooring (excluding asbestos)
    e. Exterior window wall framing, aluminum doors and frames.
    f. Casework and lockers.
    g. Masonry door, window, or passage openings.
    h. Framed partition walls, door, or passage openings in framed partition walls and footings.
    i. Doors, frames, tack, chalk and marker boards.
    j. Saw cut floor and remove concrete – coordinate cutting for plumbing and electrical with bid divisions 223000 and 260000.
    k. Toilet partitions.
9. Provide all legal off-site disposal of all construction debris generated by the described work.
10. This Contractor shall protect all existing surfaces in rooms, walls, floors, windows, etc. to prevent damage during the execution of work required.
11. This Contractor shall continuously maintain all means of egress and all fire protection feature for portions of the building that remain occupied during construction.
12. Protect any flooring during demolition that will remain.
13. Provide for proper legal off-site disposal off all construction debris generated by the described work.
14. Sufficient numbers of shop drawings are to be provided to the affected contractors (i.e. mason, electrician, etc.)
15. Provide wood base for lockers, if required.
16. Remove items indicated: clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
17. Remove and legally dispose of items not indicated to be reinstalled, salvaged or to remain the Owner's property.
18. Install all doorframes and coordinate with mason contractor.
19. Cover all countertops with double layered corrugated cardboard.
20. Clean and dust all casework upon completion.
21. Clean, prep and adjust all equipment immediately prior to Owner occupancy.
22. Patch walls after removal of existing tack strips and tack boards that are not covered by new strips or boards. Walls shall be brought to a surface ready to receive new paint.
23. Patch all demolished areas and items affected by demolition to a condition ready to receive finishes and finish materials.
24. Furnish and install all joint sealants and fire stopping 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.
25. Contractor shall broom sweep building daily.
26. Provide all temporary enclosures as required, review demo drawings throughout the duration of construction.
27. 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.
28. Provide all wood framing, plywood and nailers as shown and specified.
29. Review alternates.
30. 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.

Bid Division: 060000 – General Trades

31. 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. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. General trades contractor responsible for all housekeeping pads required.
4. Refer to demolition key note 3 on sheet B-A102.
5. Responsible for demo key notes 2-5, 7-9, 11, 13-16, and 18 on B-A103.
6. Refer to all demo notes about materials to be salvaged for reinstallation.
7. Responsible for construction key notes 2 and 7 on page B-A104.
8. Responsible for construction note 3 on page B-A106.
9. Refer to notes about concrete and roof work on page B-A106.
10. Responsible for construction notes 9-16 and 18-21 on page B-A107. See also notes about wall types.
11. Responsible for bath accessories in family toilet room to include baby changing station.
12. See notes about concrete benches on interior elevations page B-A401.
13. Refer to door and frame schedule.
14. Refer to room finish schedule.
15. Responsible for new pipe enclosure on wall for floor unit ventilators. (Painting by 099000.)
16. Responsible for all masonry infill. (Refer to notes for wall infill on exterior gym wall).
17. Responsible for all concrete work, including all saw cutting and replacement.
18. **Provide an allowance of 200 man-hours for general cleaning to be used as needed to be included in your base bid.**

Excludes:

1. All demolition of conduits, ducts, pipes, fixtures, etc. (demolition required for all mechanical, plumbing, and electrical work) is to be performed by the specific mechanical, plumbing, and electrical contractors.

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 060000

Cast In Place Concrete	033000-1	Cast In Place - PD, Mix, Shops	Cast In Place Concrete - product data, mix design and Shop Drawi
Unit Masonry	042000-1	Unit Masonry - PD	Unit Masonry - PD, Certs and Mix Designs
Rough Carpentry	061000-1	Rough Carpentry - PD	Rough Carpentry - Product data on wood materials see spec
Finish carpentry	062000-1	Finish Carpentry - PD SD	Finish Carpentry - product data and shop drawings
Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Hollow Metal Frames	081213-1	HM Frames - PD SD	Hollow Metal Frames - product data and shop drawings see spec
Flush Wood Doors	081416-1	Flush Wood Doors - PD SD	Flush Wood Doors - product data and shop drawings see spec
Flush Wood Doors	081416-2	Flush Wood Doors - Samples	Flush Wood Doors - samples of door veneer and grain and colors
Door Hardware	087100-1	Door Hardware - PD SD	Door Hardware - product data, keying/hardware schedule and sho
Flooring Removal and Prep	090561-1	Flr Removal and Prep - PD	Floor Removal and Prep - product data testing
Resilient Flooring	096500-1	Res Flooring - PD	Resilient Flooring - Product data
Resilient Flooring	096500-2	Res Flooring - Samples	Resilient Flooring - Samples of each color
Resinous Floor Coating	096700-1	Res Floor Coat - PD	Resinous Floor Coating - Product data
Resinous Floor Coating	096700-2	Res Floor Coat - Samples	Resinous Floor Coating - Samples of finish texture
Interior Wall Paneling	097800-1	Int Wall Paneling - PD SD	Interior Wall Paneling - Product Data and shop drawings
Plastic Toilet Compartments	102113.19-1	Toilet Comp - PD SD	Plastic Toilet Compartments - Product data and shop drawings see
Plastic Toilet Compartments	102113.19-2	Toilet Comp - Samples	Plastic Toilet Compartments - 2 samples of partition panels, panel
Toilet, Bath and Laundry Accesso	102800-1	Toil Bth and Laun - PD	Toilet, Bath and Laundry Accessories - product data
Metal Lockers	105113-1	Metal Lockers - PD SD	Metal Lockers - product data and shop drawings see spec
Metal Lockers	105113-2	Metal Lockers - Samples	Metal Lockers - samples of each color scheduled
General Trades - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
General Trades - Start Up	Start Up	02 Schedule of Values	Schedule of Values
General Trades - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
General Trades - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
General Trades - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
General Trades - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
General Trades - Start Up	Start Up	07 Safety Policy	Safety Policy
General Trades - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
General Trades - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
General Trades - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
General Trades - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
General Trades - Close Out	081416-3	Flush Wood Doors - Warranty	Flush Wood Doors - Manufacturer Warranty see spec
General Trades - Close Out	087100-3	Door Hardware - Manuals	Door Hardware - Manuals
General Trades - Close Out	087100-3	Door Hardware - Warranty	Door Hardware - Special warranties - see spec
General Trades - Close Out	096500-3	Res Flooring - Extra Materials	Resilient Flooring - Extra Materials - 35 sq feet of each type and co
General Trades - Close Out	102113.19-3	Toilet Comp - Warranty	Plastic Toilet Compartments -manufacturers warranty 15 year - se

General Trades - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
General Trades - Close Out	Close Out	12 Consent of Surety	Consent of Surety
General Trades - Close Out	Close Out	13 Substantial Completion	Substantial Completion
General Trades - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
General Trades - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
General Trades - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
General Trades - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
General Trades - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
General Trades - Close Out	Close Out	18 Insurance up to date	Insurance up to date
General Trades - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 091000 – Drywall, Insulation & Acoustical

Bid to Include:

Total Responsibility for Specification Sections:

Section 092116 – Gypsum Board Assemblies
Section 095113 – Acoustic Panel Ceilings

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

Section 079200 – Joint Sealants (Miscellaneous caulking, control joints, etc.)

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 makes 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 15 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.

Bid Division: 091000 – Drywall, Insulation & Acoustical

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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Divisions Inclusions:

1. All metal stud framing and drywall for bulkheads and light coves.
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. Patch existing remodeled areas as required.
9. Supply and install fire rated gypsum board tight to roof deck as indicated.
10. Expansion and control joints as required by design or product manufacturer.
11. Prior to layout of ceilings, contractor to accept humidity and temperature levels in the building.
12. Provide all drywall and plaster on metal as well as wood as indicated.
13. The on-site foreman for this Bid Division must be able to communicate with all employees and the Construction Manager's staff.
14. Follow room finish schedule.
15. Provide all vapor barriers as required by design and product manufacturer.
16. Provide all nailers and underlayment.
17. Provide all trim as it relates to Acoustical Ceiling System.
18. Provide all fasteners.
19. Furnish and install all caulking required for the work of this Bid Division.
20. Replacement and/or repair of defective and/or misaligned material installed by this contractor.
21. To repair any adjacent material damaged in the execution of the above listed work.
22. Provide smooth transition from existing work to new work.
23. Install louvers and access panels furnished by each architectural, mechanical and electrical contractor in locations encased in this contractor's work.
24. Provide all caulking and sealants for plasterwork or drywall as required.
25. Provide all EIFS work per manufacturer recommendations.

Bid Division: 091000 – Drywall, Insulation & Acoustical

26. 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 the all other specification requirements.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Furnish and install all required light-gage metal framing material and drywall, glass mat sheathing, etc. at all walls, ceilings, bulkheads, parapets, etc.
4. Furnish and install all acoustical ceiling systems, per specifications.
5. Furnish and install all materials for the bulkheads as documented.
6. Responsible for construction note 6 on page B-A104.
7. Responsible for ceiling notes 1, 3, 4, and 7 on page B-A105.
8. Responsible for construction note 6 on B-A107.
9. Refer to room finish schedule.

Excludes:

1. Plaster ceilings in areas believed to have asbestos to be removed by others. Refer to notes.

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 091000

Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Gypsum Board Assemblies	092116-1	Gypsum Board - PD	Gypsum Board - product data
Acoustical Ceilings	095100-1	Acoustical Ceilings - PD	Acoustical Ceilings - product data
Drywall, Ins Acoustical - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Drywall, Ins Acoustical - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Drywall, Ins Acoustical - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Drywall, Ins Acoustical - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Drywall, Ins Acoustical - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Drywall, Ins Acoustical - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Drywall, Ins Acoustical - Start Up	Start Up	07 Safety Policy	Safety Policy
Drywall, Ins Acoustical - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Drywall, Ins Acoustical - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Drywall, Ins Acoustical - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
Drywall, Ins Acoustical - Close Ou	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Drywall, Ins Acoustical - Close Ou	095100-3	Acoustical Ceilings - Extra Material	Acoustical Ceilings - Extra Materials - Furnish 2% of amoun installe
Drywall, Ins Acoustical - Close Ou	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Drywall, Ins Acoustical - Close Ou	Close Out	12 Consent of Surety	Consent of Surety
Drywall, Ins Acoustical - Close Ou	Close Out	13 Substantial Completion	Substantial Completion
Drywall, Ins Acoustical - Close Ou	Close Out	14 Hazardous Material Form	Hazardous Material Form
Drywall, Ins Acoustical - Close Ou	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Drywall, Ins Acoustical - Close Ou	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Drywall, Ins Acoustical - Close Ou	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Drywall, Ins Acoustical - Close Ou	Close Out	18 As Built Drawings	As Built Drawings with red lines
Drywall, Ins Acoustical - Close Ou	Close Out	18 Insurance up to date	Insurance up to date
Drywall, Ins Acoustical - Close Ou	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 099000 – Painting

Bid to Include:

Total Responsibility for Specification Sections:

Section 099000 – Painting and Coating
Section 090001 – Dryfall Painting

Limited Responsibility for Specification Sections (as it relates to work in 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 makes 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 15 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.

Bid Division: 099000 – Painting

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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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 any and all dissimilar surfaces including door and window frames, CMU & Drywall.
15. Clean, dust and dirt off bar joist, deck and ductwork prior to painting.

Bid Division: 099000 – Painting

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Provide complete prep and painting of existing surfaces as documented.
4. Prep and paint all exposed roof framing, duct work, conduits and any other materials as documented.
5. Paint all exposed drywall and CMU as documented.
6. Paint all hollow metal frames and doors as documented.
7. Paint all bulkheads.
8. Provide all caulking of interior control joints in masonry, drywall, and drywall to dissimilar materials and inside masonry corners.
9. Responsible for construction notes 3-5, and 17 on page B-A104.
10. Refer to painting notes on mezzanine floor plan page B-A104.
11. Responsible for Ceiling notes 2 and 5 on page B-A105.
12. See painting notes on pages B-A107 and B-A401 for mezzanine, locker room, and gym areas.
13. Refer to room finish schedule.

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 099000

Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Painting and Coating	099000-1	Painting and Coating - PD	Painting and Coatings - product data see spec
Painting and Coating	099000-2	Painting and Coating - Samples	Painting and Coatings - samples of each color and texture
Dryfall Painting	099001-1	Dryfall Painting - PD	Dryfall Painting - product data see spec
Painting - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Painting - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Painting - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Painting - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Painting - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Painting - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Painting - Start Up	Start Up	07 Safety Policy	Safety Policy
Painting - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Painting - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Painting - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
Painting - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Painting - Close Out	099000-3	Painting and Coating - Extra material	Painting and Coatings - Extra material - furnish paint and coatings
Painting - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Painting - Close Out	Close Out	12 Consent of Surety	Consent of Surety
Painting - Close Out	Close Out	13 Substantial Completion	Substantial Completion
Painting - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
Painting - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Painting - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Painting - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Painting - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
Painting - Close Out	Close Out	18 Insurance up to date	Insurance up to date
Painting - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 105100 – Metal Lockers

Bid to Include:

Total Responsibility for Specification Sections:

Section 105113 – Metal Lockers

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 makes 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 15 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 the 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. Contractors 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.

Bid Division: 105100 – Metal Lockers

19. **Wolgast uses a web-based construction software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Responsible for demo note 10 on page B-A103. Lockers to be salvaged if an alternate is not chosen.
4. Responsible for construction note 10 on page B-A107.
5. **Provide Alternate #2 pricing per demo notes on B-A103 and floor plan notes on page B-A107.**

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 105100

Metal Lockers	105113-1	Metal Lockers - PD SD	Metal Lockers - product data and shop drawings see spec
Metal Lockers	105113-2	Metal Lockers - Samples	Metal Lockers - samples of each color scheduled
Metal Lockers - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Metal Lockers - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Metal Lockers - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Metal Lockers - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Metal Lockers - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Metal Lockers - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Metal Lockers - Start Up	Start Up	07 Safety Policy	Safety Policy
Metal Lockers - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Metal Lockers - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Metal Lockers - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
Metal Lockers - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Metal Lockers - Close Out	Close Out	12 Consent of Surety	Consent of Surety
Metal Lockers - Close Out	Close Out	13 Substantial Completion	Substantial Completion
Metal Lockers - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
Metal Lockers - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Metal Lockers - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Metal Lockers - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Metal Lockers - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
Metal Lockers - Close Out	Close Out	18 Insurance up to date	Insurance up to date
Metal Lockers - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 222300 – Plumbing & HVAC Systems

Bid to Include:

Total Responsibility for Specification Sections:

Section 024100 – Demolition (As it relates to work in this bid division)
Section 075400 – Thermoplastic Membrane Roofing
Section 200010 – Basic Mechanical Requirements
Section 220553 – Identification for Plumbing Piping and Equipment
Section 220719 – Plumbing Piping Installation
Section 220800 – Commissioning of Plumbing
Section 221005 – Plumbing Piping
Section 221006 – Plumbing Piping Specialties
Section 224000 – Plumbing Fixtures
Section 230593 – Testing, Adjusting and Balancing for HVAC
Section 230713 – Duct Insulation
Section 230719 – HVAC Piping Insulation
Section 230800 – Commissioning of HVAC
Section 230901 – Building Management and Control System
Section 230902 – Control Sequences
Section 232113 – Hydronic Piping
Section 232114 – Hydronic Specialties
Section 232123 – Hydronic Pumps
Section 232300 – Refrigerant Piping
Section 232500 – HVAC Water Treatment
Section 233100 – HVAC Ducts and Casings
Section 233300 – Air Duct Accessories
Section 233423 – HVAC Power Ventilators
Section 233700 – Air Outlets and Inlets
Section 235216 – Condensing Boilers
Section 236313 – Air Cooled Refrigerant Condensers
Section 237313 – Modular Central-Station Air-Handling Units.
Section 237413 – Packaged Outdoor Central Station Air Handling Units.
Section 237414 – Packaged Outdoor Central Air Handling Units (RTU-3)
Section 238101 – Terminal Heat Transfer Units

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

Section 078413 – Penetration Firestopping
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:

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

Bid Division: 222300 – Plumbing & HVAC Systems

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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: 222300 – Plumbing & HVAC Systems

Division Inclusions:

1. Concrete Patching for mechanical and electrical trades by Bid Division 15000 and 16000
2. Selective Demolition (concrete floors, etc.).
3. No concrete is to be installed until verification of acceptable density testing. 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.
4. Provide all blocking required for plumbing fixture mounting.
5. Perform all connections between site utilities and building, coordinate with site contractor on utilities.
6. Patch floors with concrete, where existing fixtures and pipe are removed and capped.
7. Removal of all plumbing and heating fixtures.
8. Provide proper repair of all ceilings, walls, floors, etc., when installing new piping fixtures and hangers.
9. Furnish and install all fixtures in cabinetry as required.
10. Provide all final connections and hook-ups for kitchen equipment.
11. Furnish all louvers and access panels to masonry and drywall contractors for installation.
12. 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).
13. Patch all demolished areas and items affected by HVAC & plumbing demolition to a condition ready to receive finishes and finish materials (finish materials by others, i.e. carpet, tile paint, etc.).
14. Perform all excavating, backfill, and compaction required for the work of this bid division.
15. Furnish and install duct detectors, back draft dampers, etc. as shown and specified, and/or required by Code.
16. Perform all demolition necessary for the completion of the work of this Bid Division as shown and specified.
17. Provide all final plumbing hook-ups to all plumbing related fixtures and equipment.
18. Provide coordination with roofing and metal contractors for roof penetrations, equipment rails and pipe boots including layouts.
19. Maintain fire rating in all walls penetrated.
20. Remove spoils from site.
21. Provide all required layout and verify that no conflict occurs with other trades.
22. Furnish operating and maintenance manuals.
23. Provide record and as-built drawings.
24. Provide all necessary connection between temperature control and instrumentation devices and equipment to be controlled.
25. Provide roof curbs for rooftop equipment.
26. Provide all permits required.
27. 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.
28. Provide temporary water distribution as required.
29. Provide all State Certification for equipment (boilers, etc.).
30. Refer to all equipment schedules for additional equipment to be furnished and installed (including kitchen equipment and kitchen equipment schedules).
31. Abandoning of retired plumbing.
32. Provide testing, adjusting, and balancing of hydronic systems.
33. Test, adjust, and balance of air system as required.
34. Provide copies of the test and balance report to the Construction Manager within (10) calendar days of completing the test and balance field procedures.
35. Contractor shall coordinate phased delivery of all pre-purchased equipment with supplier.
36. Contractor shall maintain existing HVAC systems in fully functional order in occupied areas of the building throughout the duration of the project.
37. 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.

Bid Division: 222300 – Plumbing & HVAC Systems

38. Remove, clean and reinstall all existing grids, vents, registers and diffusers including those mounted in metal ceiling grid systems.
39. All HVAC equipment is to be completed with all motor starters, disconnects or other items to allow for the proper operation of the system.
40. Disconnect all roof top units to allow roofing contractor to raise and replace flashings as required.
41. Provide start-up training with Owner Representative, Architect and Construction Manager for all equipment installed.
42. Final installation and all work by this bid division must comply with governing building and life safety codes.
43. Provide water test approval two weeks before Owner Occupancy.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Refer to demo drawings for removal of Mechanical and Plumbing equipment.
4. Include cost for all required permits in bid proposal and coordinate all required inspections.
5. Provide all required plumbing and HVAC demolition as documented.
6. Furnish and install all new and temporary water and gas piping and connections as required by this project.
7. All plumbing and HVAC installations to meet all required governing requirements.
8. Furnish and install all prefabricated curbs and/or wood material as required for mechanical equipment curbing
9. Furnish and install all required gas piping.
10. Furnish and install all required hydronic piping.
11. Furnish and install all required refrigerant lines.
12. Furnish and install all required waste, water supply, and vent piping.
13. Final installation of all casework gas, domestic water, and sanitary hook-ups.
14. Provide all required plumbing and HVAC insulation.
15. Provide all required test and balance work.
16. Furnish and install duct detectors. Final connection and certification will be by fire alarm contractor under bid division 260000.
17. Fire seal any penetrations to maintain wall integrity. All corridor walls shall be considered rated walls.
18. Furnish and install all required fire dampers.
19. Provide all required temperature control work for a complete operational system.
20. Provide complete Owner's Training of Temperature Control System.
21. This contractor will be required to provide information pertaining to the energy incentive program of the utility company.
22. Daily clean-up is required, as it pertains to this bid division.
23. Coordinate with the school's controls contractor (Barber Coleman) for all controls work.
24. Refer to Mechanical schedules on pages B-M001 and B-M002.
25. Responsible for all new work on Mechanical and Plumbing pages.
26. Refer to the note on the typical floor unit ventilator detail on page B-M501 for metal to be provided. Coordinate with bid division 099000 for painting.
27. Contractor responsible for providing information to Construction Manager to help coordinate energy rebate information for all new work.

Bid Division: 222300 – Plumbing & HVAC Systems

28. Coordinate all flashing of new roof curbs, duct supports & pipe supports for this bid division. This contractor is responsible for all necessary flashing on this project.
29. This contractor is responsible for all roof work.

Excludes:

1. Saw cutting and replacement to be completed by the General Trades contractor.
2. Wood pipe enclosures on wall for unit ventilators to be completed by Bid Division 060000.
3. All roof membrane repairs to be covered 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-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 222300

Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
ID for Plumbing Pipe and Equipm	220553-1	ID for Plumbing - PD/chart/schedule	ID for Plumbing - product data and chart and schedule - see spec
Plumbing Piping Insulation	220719-1	Plumbing Pipe Ins - PD	Plumbing Piping Insulation - product data
Plumbing Piping	221005-1	Plumbing Piping - PD/SD	Plumbing Piping - product data and shop drawings - see spec
Plumbing Piping Specialties	221006-1	Plumbing Piping Spec - PD SD	Plumbing Piping Specialties - Product data and shop drawings see
Plumbing Fixtures	224000-1	Plumbing Fixt - PD	Plumbing Fixtures - product data
Plumbing Fixtures	224000-2	Plumbing Fixt - samples	Plumbing Fixtures - samples - two sets of color chips for each tand
Duct Insulation	230713-1	Duct Insulation - PD	Duct Insulation - product data see spec
Duct Insulation	230713-2	Duct Insulation - Samples	Duct Insulation - two samples of size for each insulation type
HVAC Piping Insulation	230719-1	HVAC Pipe Ins - PD	HVAC Piping Insulation - product data
Building Management and Contr	230901-1	Control Sys - PD/SD	Control System - product data and shop drawings - see specs
Hydronic Piping	232113-1	Hydronic Piping - PD	Hydronic Piping - Product data
Hydronic Specialties	232114-1	Hydronic Spec - PD	Hydronic Specialties - product data and certs
Hydronic Pumps	232123-1	Hydronic Pumps - PD	Hydronic Pumps - product data
Refrigerant Piping	232300-1	Refrigerant Pipe - PD SD	Refrigerant Piping - product data and shop drawings see spec
HVAC Water Treatment	232500-1	HVAC Water Trmt - PD SD	HVAC Water Treatment - product data and shop drawings see spe
HVAC Ducts and Casings	233100-1	HVAC Ducts/Casings - shops	HVAC Ducts and Casings - shop drawings see spec
Air Duct Accessories	233300-1	Air Duct Acc - PD SD	Air Duct Accessories - product data and shop drawings see spec
HVAC Power Ventilators	233423-1	HVAC Pwr Vent - PD	HVAC Power Ventilators - product data
Air Outlets and Inlets	233700-1	Air Out/Inlets - PD	Air Outlets and Inlets - product data see spec
Condensing Boilers	235216-1	Boilers - PD/SD	Boilers - product data and shop drawings
Air Cooled Refrigerant Condense	236313-1	Air Cooled Ref Cond - PD/SD	Air Cooled Refrigerant Condensers - product data and shop drawi
Modular Central Station Air Han	237313-1	Cent Stat Air Hand Units - PD/SD	Modular Central Station Air Handling Units - product data and sho
Packaged Outdoor Central Static	237413-1	OutDr Cent Stat Air Units - PD/SD	Packaged Outdoor Central Station Air Handling Units - product dat
Packaged Outdoor Central Air Ha	237414-1	OutDr Cent Stat AHU RTU 3 - PD/SD	Packaged Outdoor Central Air Handling Units RTU-3 - product data
Terminal Heat Transfer Units	238101-1	Term Heat Trans Units - PD/SD	Terminal heat Transfer Units - product data and shop drawings - s
Mechanical - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Mechanical - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Mechanical - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Mechanical - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Mechanical - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Mechanical - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Mechanical - Start Up	Start Up	07 Safety Policy	Safety Policy
Mechanical - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Mechanical - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Mechanical - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications

Mechanical - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Mechanical - Close Out	220800-1	Comm for Plumb - testing	Commissioning of Plumbing - Testing see spec
Mechanical - Close Out	221006-2	Plumbing Piping Spec - Extra material	Plumbing Piping Specialties - extra loose keys for hotside hoe bibb
Mechanical - Close Out	224000-3	Plumbing Fixt - Warranty	Plumbing Fixtures -5 yr manufacturers warranty for electric water
Mechanical - Close Out	230593-1	Testing Balancing - testing reports	Testing, Balancing - testing reports - see spec for the details
Mechanical - Close Out	230713-3	Duct Insulation - maintenance	Duct Insulation - manufacturers instructions see spec
Mechanical - Close Out	230800-1	Comm for HVAC - Testing	Commissioning of HVAC - testing reports
Mechanical - Close Out	230901-2	Control Sys - Manual	Control System - O&M Manuals
Mechanical - Close Out	230901-3	Control Sys - software	Control System - software
Mechanical - Close Out	232113-2	Hydronic Piping - mntnc dta	Hydronic Piping - maintenance data - see spec
Mechanical - Close Out	232113-3	Hydronic Piping - extra material	Hydronic Piping - provide two repacking kits for each size and valv
Mechanical - Close Out	232114-2	Hydronic Spec - Man install inst	Hydronic Specialties - manufacturers installation instruction
Mechanical - Close Out	232114-3	Hydronic Spec - Mtnc data	Hydronic Specialties - Maintenance data - see spec
Mechanical - Close Out	232123-2	Hydronic Pumps - Extra material	Hydronic Pumps -extra pump seals - one set for each type and size
Mechanical - Close Out	232500-2	HVAC Water Trmt - Mtnc	HVAC Water Treatment - maintenance material
Mechanical - Close Out	232500-3	HVAC Water Trmt - owner training	HVAC Water Treatment - owner training
Mechanical - Close Out	233423-2	HVAC Pwr Vent - extra material	HVAC Power Ventilators - extra fan belts one set for each individu
Mechanical - Close Out	235216-2	Boilers - Testing	Boilers - Testing
Mechanical - Close Out	235216-3	Boilers - Manuals	Boilers - O&M Manuals see spec
Mechanical - Close Out	235216-4	Boilers - Warranty	Boilers -standard warranty for fire tube condensing boilers
Mechanical - Close Out	235216-5	Boilers - Owner Training	Boilers - Owner Training - see spec
Mechanical - Close Out	237413-2	OutDr Cent Stat Air Units - Warranty	Packaged Outdoor Central Station Air Handling Units -warranty - 1
Mechanical - Close Out	237413-3	OutDr Cent Stat Air Units - Manual	Packaged Outdoor Central Station Air Handling Units -O&M Manu
Mechanical - Close Out	237414-2	OutDr Cent Stat AHU RTU 3 - Warranty	Packaged Outdoor Central Air Handling Units RTU-3 - Warranty - s
Mechanical - Close Out	237414-3	OutDr Cent Stat AHU RTU 3 - Manuals	Packaged Outdoor Central Air Handling Units RTU-3 - O&M Manua
Mechanical - Close Out	238101-2	Term Heat Trans Units - Extra materials	Terminal heat Transfer Units -extra filters one set of each type and
Mechanical - Close Out	238101-3	Term Heat Trans Units - Warranty	Terminal heat Transfer Units - 5 yr manufacturers warranty for far
Mechanical - Close Out	238101-4	Term Heat Trans Units - Manual	Terminal heat Transfer Units - O&M Manual
Mechanical - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Mechanical - Close Out	Close Out	12 Consent of Surety	Consent of Surety
Mechanical - Close Out	Close Out	13 Substantial Completion	Substantial Completion
Mechanical - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
Mechanical - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Mechanical - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Mechanical - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Mechanical - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
Mechanical - Close Out	Close Out	18 Insurance up to date	Insurance up to date
Mechanical - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 260000 – Electrical

Bid to Include:

Total Responsibility for Specification Sections:

Section 200020 – Electrical Requirements for Mechanical Work
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 260800 – Electrical Commissioning and Testing Requirements
Section 262200 – Low Voltage Transformers
Section 262416 – Panelboards
Section 262726 – Wiring Devices
Section 262813 – Fuses
Section 262816.16 – Enclosed Switches
Section 265100 – Interior Lighting
Section 283101 – Fire Alarm Systems

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

Section 078413 – Penetration Firestopping
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 conduit, 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

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Contractor shall maintain existing electrical systems in fully functional order in all areas of the building during the duration of the project.
2. Contractor shall coordinate with utility company for purchase and installation of exterior transformers and associated work, if required.
3. 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.
4. 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.
5. Contractor is responsible for disconnecting, removing and legal and proper off site disposal of all indicated existing light fixtures including ballasts and bulbs. Ballasts shall be assumed to contain PCB's. Provide Owner with appropriate documentation of disposal.
6. Remove, clean and reinstall light fixtures where indicated.
7. Removal of electrical line power pole to old portable location.
8. Concrete Patching for mechanical and electrical trades by Bid Division 15000 and 16000.

Bid Division: 260000 – Electrical

9. Selective Demolition.
10. No concrete is to be installed until verification of acceptable density testing. 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.
11. Provide hook-up, final connection and interlocks for kitchen exhaust fan and kitchen make-up air units to hood controls.
12. Provide all permits required.
13. Supply and install exterior lights. (Including parking lot light bases.)
14. Remove spoils from site.
15. Provide all means necessary to provide temporary transformers to keep the school in operation before the final power turnover is complete.
16. Provide all cutting and patching required for existing tie-ins.
17. Maintain fire rating at all walls penetrated.
18. All excavation, backfill, compaction, and disposal of spoil for any electrical work placed below finish grade.
19. Coordinate with other trades for rough-in locations.
20. Provide temporary lighting and power distribution. A minimum of 100 watts of temporary lighting per 250 SF of floor area.
21. Provide all plywood or nailers required for mounting of electrical, audio, fire alarm or phone equipment.
22. Furnish any access hatches to mason and drywall contractors for installation required for electrical work.
23. Final hook-up of all equipment for other disciplines of work.
24. Patch all demolished areas affected by the electrical demolition to a condition ready to receive finish materials (finish materials by others, i.e. tile, carpet, etc.).
25. Perform all required demolition required for this trade as shown and specified.
26. Furnish and install all light and power fixtures in cabinetry.
27. Provide all final connection for kitchen equipment.
28. Supply and install a complete & operational fire protection alarm system.
29. Contractor is responsible for complete code compliance of Fire Alarm System.
30. Provide "As Built" Drawings for work.
31. Provide shop drawings to State Fire Marshal Plan Review or governing authority (allowing sufficient time for changes that may be made and must be completed prior to beneficial occupancy.)
32. Provide proper repair of all damaged ceilings, walls, floors, etc., when installing new fixtures.
33. Install pull box and chase conduit for temp control.
34. Provide Owner with training of new equipment.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. **Provide allowance of $10,000 to be included in the base bid for any above-ceiling wiring to be brought up to code if required due to removal of ceiling systems. All work must be approved by Wolgast Field Manager prior to work being done.**
4. Include costs for all required permits in bid proposal.
5. Provide all required electrical demolition work as documented and for the completion of the new work.

Bid Division: 260000 – Electrical

6. Provide all required temporary power and lighting.
7. Provide all required power disconnection at existing mechanical equipment and new power connections for new mechanical equipment.
8. This bid division responsible for Fire Alarm System, IF this needs any attention during the project.
9. Provide final electrical connection for all equipment.
10. Contractor responsible for ALL firestopping, as it pertains to this bid divisions work.
11. Daily clean-up is required, as it pertains to this bid division.
12. This contractor is responsible for all demo notes on electrical pages.
13. Coordinate with Bid Division 222300 for electrical demo for making safe before mechanical demo work.
14. Refer to notes for Unit "C" electrical demo for work to be completed by others.
15. Contractor responsible for providing information to Construction Manager to help coordinate energy rebate information for all new work.
16. **Provide alternate #1 price per notes on electrical demo pages B-E101, B-E102 and new plan pages B-E106 and B-E107.**

Excludes:

1. Lights in areas with asbestos removal to be removed by others. Refer to demo notes.

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 260000

Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Low Voltage Electrical Power Co	260519-1	Cond/Cables - PD	Low Voltage Electrical Power Conductors and Cables - product dat
Grounding and Bonding for Elect	260526-1	Ground/Bonding - PD	Grounding and Bonding - product data
Hangers and Supports for Electri	260529-1	Hanger/Supports - PD	Hangers and Supports - product data
Conduit for Electrical Systems	260533.13-1	Conduit - PD	Conduit - product data
Boxes for Electrical Systems	260533.16-1	Boxes - PD	Boxes - product data - see spec
Boxes for Electrical Systems	260533.16-2	Boxes - Samples	Boxes - samples of floor boxes - see spec
Identification for Electrical syste	260553-1	ID - PD	Identification for Electrical systems - product data
Low Voltage Transformers	262413-1	Low Volt Trans - PD SD	Low Voltage Transformers - product data and shop drawings
Panelboards	262416-1	Panelboards - PD SD	Panelboards - product data and shop drawings see spec
Wiring Devices	262726-1	Wiring Devices - PD	Wiring Devices product data see spec
Fuses	262813-1	Fuses - PD	Fuses - product data see spec
Enclosed Switches	262816.16-1	Enclosed Switches - PD	Enclosed Switches - product data see spec
Interior Lighting	265100-1	Interior Lighting - PD	Interior Lighting - product data - see spec
Fire Detection and Alarm	284600-1	Fire Ded/Alarm - PD SD	Fire Detection and Alarm - product data and shop drawings - see s
Electrical - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Electrical - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Electrical - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Electrical - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Electrical - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Electrical - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Electrical - Start Up	Start Up	07 Safety Policy	Safety Policy
Electrical - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Electrical - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Electrical - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
Electrical - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Electrical - Close Out	260533.16-3	Boxes - extra materials	Boxes - furnish keys for lockable enclosures two of each different
Electrical - Close Out	260800-1	Comm/Test - reports	Commissioning and Testing - Test Reports - see spec
Electrical - Close Out	260800-2	Comm/Test - Manuals	Commissioning and Testing - O&M Manuals
Electrical - Close Out	262416-2	Panelboards - Extra Material	Panelboards - Extra keys - 2 for each different key
Electrical - Close Out	265100-2	Interior Lighting - Warranty	Interior Lighting - Warranties - see spec
Electrical - Close Out	284600-2	Fire Ded/Alarm - Warranty	Fire Detection and Alarm - Warranty - see spec
Electrical - Close Out	284600-3	Fire Ded/Alarm - manual	Fire Detection and Alarm - O&M Manuals - see spec
Electrical - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Electrical - Close Out	Close Out	12 Consent of Surety	Consent of Surety
Electrical - Close Out	Close Out	13 Substantial Completion	Substantial Completion

Electrical - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
Electrical - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Electrical - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Electrical - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Electrical - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
Electrical - Close Out	Close Out	18 Insurance up to date	Insurance up to date
Electrical - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 030100 – Concrete

Bid to Include:

Total Responsibility for Specification Sections:

Section 321313 – Concrete Paving
Section 033000 – Cast In Place Concrete
Section 033511 – Concrete Floor Finishes
Section 033523 – Exposed Aggregate Concrete Finishing
Section 116833.43 – Track and Field Equipment

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

Section 024100 – Demolition (As it relates to this Bid Division)
Section 079200 – Joint Sealants (As it relates to this Bid Division)
Section 072100 – Thermal Insulation (As it relates to this bid division)
Section 072700 – Air Barriers (As it relates to this bid division)
Section 311000 – Earth Moving (As it relates to fine grading, final compaction & footing 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 makes a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.

Bid Division: 030100 – Concrete

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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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 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.

Bid Division: 030100 – Concrete

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. Contractors 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 the Construction Manager after Site Work contractor has established the building pad.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Perform all excavating, backfill, and compaction required for footings and foundations.
4. Provide all concrete footings and foundation walls.
5. The Concrete Contractor shall include all staking and engineered control points and offsets as required for all new exterior concrete slabs and footings/foundations.
6. Furnish and install all horizontal and vertical rigid insulation below slabs.
7. Furnish and install steel reinforcement embedded in concrete as indicated.
8. Furnish and install all required vapor barriers, expansion joint materials and all interior and exterior joint sealants as it pertains to concrete work.
9. Furnish and install all required dowels at new to existing concrete slabs, sidewalks, curbs, footings, foundations, etc.
10. Coordinate with Bid Division 222300 and 260000 contractors prior to installation of all floor drains and floor boxes.
11. Provide and install all polished and sealed concrete as indicated on the construction documents. This includes all staining, polishing, sealing and finishing as required by project specifications. Once concrete slabs are placed, provide protection of any slabs to receive these specialty finishes.
12. 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.
13. **Pine River Elementary**
    a. This contractor is responsible for all interior and exterior concrete new work, including thickened slabs.
    b. See foundation plan on page E-S100 and E-A103 for required work.
    c. Refer to slab on grade plan on page E-S100.
    d. See construction note 2 on page E-A101 for floor infill.
    e. Responsible for Demo note 2 on page E-A102.
    f. Responsible for construction note 5 on page E-A103 refer to spec sections 033551 and 033523.
    g. Refer to room finish schedule for areas of stained polish concrete.
    h. Responsible for construction notes 3 and 4 on page E-C102.
    i. Coordinate with bid division 310000 for removal of exterior concrete. Saw cutting of exterior concrete is the responsibility of this bid division.

14. **Bullock Creek High School**
    a. This contractor responsible for new discus cage work.
    b. Refer to the discus plan and elevation on page A-A601 for scope of work.

Bid Division: 030100 – Concrete

c. Refer to spec. Section 116833.43 for discus cage requirements.
d. Interior concrete and masonry work to be the responsibility of bid division 060000. (High School only)

15. **Floyd Elementary**
    a. This contractor is responsible for work associated with the new canopy.
    b. Refer to page D-S100 for concrete pier work.
    c. Refer to page D-A104 for foundation plan concrete work.
    d. Refer to page D-A104 for removal and replacement of existing concrete sidewalk.
    e. Interior concrete work to be completed by bid division 060000.

Excludes:

1. Concrete Testing

END OF BID DIVISION 030100

Cast In Place Concrete	033000-1	Cast In Place - PD, Mix, Shops	Cast In Place Concrete - product data, mix design and Shop Drawir	Product Data
Concrete Floor Finishes	033511-1	Concrete Floor Finishes - PD	Concrete Floor Finishes - product data	Product Data
Exposed Aggregated Concre	033523-1	Exposed Concrete Finishes - samples	Exposed Aggregate Concrete Finishing - Samples of each size colo	Samples
Thermal Insulation	072100-1	Thermal Ins - PD	Thermal Insulation - Product Data	Product Data
Air Barriers	072700-1	Air Barriers - PD SD	Air Barriers - Product data and Shop drawings - see spec	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Track and Field Equipment	116833.43-1	Track/Field Eq - PD SD	Track and Field Equipment - product data and shop drawings see	Product Data
Concrete Paving	321313-1	Concrete Paving - PD/Mix	Concrete Paving - product data and mix design - see spec	Product Data
Concrete - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Concrete - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Concrete - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Concrete - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Concrete - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Concrete - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Concrete - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Concrete - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Concrete - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Concrete - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Concrete - Close Out	033511-1	Concrete Floor Finishes - Warranty	Concrete Floor Finishes - 2 yr manufacturers warranty - see spec	Close Out
Concrete - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Concrete - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Concrete - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Concrete - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Concrete - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Concrete - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Concrete - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Concrete - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Concrete - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Concrete - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Concrete - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 040000 – Masonry

Bid to Include:

Total Responsibility for Specification Sections:

Section 042000 – Unit Masonry
Section 044202 – Cut Stone Masonry

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

Section 072100 – Thermal Insulation (As it relates to rigid insulation directly behind masonry)
Section 078413 – Penetration Firestopping (As it relates to this Bid Division)
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:

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 makes 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.

Bid Division: 040000 – Masonry

12. Must provide all submittals within 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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. All toothing and patching as required for all work related to this project. (Coordinate with Bid Division 024200.)
12. Grout all jambs and headers of all hollow metal frames, and brass door jambs per manufacturer's recommendation.
13. The brick is the responsibility of the masonry contractor, to purchase and install.
14. The mason contractor is responsible to remove all excess mortar from salvaged brick prior to installation.
15. Removal of mortar from floors, clean with cleaner and water to remove excess mortar and mortar dust.
16. Cavity wall insulation includes all insulation extending beyond the top of the brick or veneer line but laying against the CMU wall as specified.
17. Provide through wall flashing at building tie-ins, including any demolition required.
18. Temporarily brace masonry as required by industry standards and MIOSHA, to include temporary warning signage and barricades.
19. Samples of brick for exterior walls will be tested for efflorescence per ASTM C67 prior to acceptance of brick.

Bid Division: 040000 – Masonry

20. 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.
21. Install access doors in masonry walk.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Provide all required grouting of all hollow metal frames in new masonry work. Any additional cost incurred by another bid division contractor required to correct a frame that is not plumb due to lack of proper installation, will be the responsibility of this contractor.
4. Furnish and install fire-resistive joint system materials and compressible joint filler at new masonry to existing construction.
5. Provide all caulking of all masonry 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 reinstalled. Confirm color of exterior caulking with the Architect prior to installation.
6. Install all steel bearing plates on new and existing masonry as documented. The contractor is responsible to cut the existing masonry wall for the beam pocket, furnish and install grout below the bearing plate then set the bearing plate as furnished by the metals bid division contractor.
7. Install all steel lintels as furnished by bid division 050000.
8. Furnish and install all required anchors for new masonry to existing materials.
9. **Pine River Elementary**
    a. Furnish and install all required interior and exterior masonry materials.
    b. Provide all required masonry toothing and patching of CMU and brick
    c. Refer to notes on masonry wall elevation on page E-S100.
    d. Refer to construction note 2 on page E-A103 for two hr rated wall assembly.
10. **Floyd Elementary**
    a. Furnish and install all required interior and exterior masonry materials.
    b.
    c. This contractor is responsible for masonry work associated with the new canopy.
    d. See brick pier plan detail on page D-S100.
    e. Refer to pages D-A201 and D-A301 for associated work.
    f. This bid division is responsible for construction note 4 on page D-A103.

Excludes:

1. Foundation perimeter slab insulation.
2. Steel doorframes provided and 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-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 040000

Unit Masonry	042000-1	Unit Masonry - PD	Unit Masonry - PD, Certs and Mix Designs	Product Data
Cut Stone	044302-1	Cut Stone - PD	Cut Stone - product data, shop drawings	Product Data
Cut Stone	044302-2	Cut Stone - Samples	Cut Stone - Samples - of each kind, type and color - see spec	Samples
Thermal Insulation	072100-1	Thermal Ins - PD	Thermal Insulation - Product Data	Product Data
Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Masonry - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Masonry - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Masonry - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Masonry - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Masonry - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Masonry - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Masonry - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Masonry - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Masonry - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Masonry - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Masonry - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Masonry - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Masonry - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Masonry - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Masonry - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Masonry - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Masonry - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Masonry - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Masonry - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Masonry - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Masonry - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 050000 – Metals

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

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

Section 024200 – Selective demolition (As it pertains to this bid division)
Section 033000 – Cast In Place Concrete (Provide steel to be embedded in concete)
Section 042000 – Unit Masonry (Provide steel to be embedded in masonry)
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:

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 makes a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.

Bid Division: 050000 – Metals

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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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. Provide prime touch-up paint and cleaning of erected steel as required for proper finish painting of all steel.
5. Maintain cleanliness of steel until erected.
6. Clean any dirt or debris from steel in a condition ready to receive paint and acceptable by painting contractor.
7. 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.
8. Provide all special inspections required per specifications.
9. 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.
10. Provide all perimeter roof angles.
11. Provide and install all miscellaneous steel for roof curbs and roof draining and RTU.
12. Prime all weldings with primer.
13. Furnish & Install bridging, fasteners, and accessories for a complete installation.
14. Furnish bearing plates, sleeves and guard posts for installation by others.

Bid Division: 050000 – Metals

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Furnish and install all required joist and steel decking.
4. Furnish and install all required structural and miscellaneous steel.
5. Furnish and install all steel decking as required in drawings.
6. Furnish and install all steel angles for steel decking supports.
7. Furnish all steel lintels required for installation by others.
8. Furnish and install all steel columns as required by drawings.
9. Furnish and install all roof opening frames.
10. Furnish and install all required reinforcing of existing roof steel framing.
11. Furnish and install angles at fire-rated walls as documented.
12. Daily clean up required by this Bid Division.

13. **Pine River Elementary**
    a. Refer to structural drawing E-S100 for structural steel framing responsibilities.
    b. Refer to details for all steel on page E-S300.
    c. Refer to proposed structural framing plan on page E-A101 for this contractor's responsibility.

14. **Floyd Elementary**
    a. This contractor is responsible for metals work associated with new canopy.
    b. Cold form metal framing to be completed by bid division 060000.
    c. Refer to page D-S100 for structural steel work.
    d. Exposed steel to be primed and ready for paint.
    e. Coordinate with bid division 030100 for attaching steel column to concrete pier.
    f. Refer to enlarged framing plan on page D-A102 for steel framing responsibilities.

15. **Bullock Creek High School**
    a. This contractor is responsible for all demolition and installation of new roof framing per roof framing plan on page A-A104.
    b. Coordinate with bid division 222300 for new roof penetrations.
    c. Refer to steel column section on page A-A104 for steel column work.
    d. **Refer to page A-A102 for Alternate #1 and provide alternate pricing for CMU wing walls.**

Excludes:

1. Installation of embedded steel (anchor bolts, lintels, etc.)

Bid Division: 050000 – Metals

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 050000

Steel Framing	051200-1	Steel Framing - SD	Steel Framing - Shop Drawings see spec	Shop Drawings
Steel Joist Framing	052100-1	Steel Joist Framing - SD	Steel Joist Framing - Shop Drawings - see spec	Shop Drawings
Steel Decking	053100-1	Steel Decking - SD	Steel Decking - Shop drawings, certs	Shop Drawings
Metal Fabriations	055000-1	Metal Fabrications - PD SD	Metal Fabrications - product data and shop drawings see spec	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Metals - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Metals - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Metals - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Metals - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Metals - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Metals - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Metals - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Metals - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Metals - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Metals - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Metals - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Metals - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Metals - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Metals - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Metals - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Metals - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Metals - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Metals - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Metals - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Metals - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Metals - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 060000 – General Trades

Bid to Include:

Total Responsibility for Specification Sections:

Section 054400 – Cold-Formed Metal Trusses
Section 061000 – Rough Carpentry
Section 062000 – Finish Carpentry
Section 064100 – Architectural Wood Casework
Section 081213 – Hollow Metal Frames
Section 081416 – Flush Wood Doors
Section 101100 – Visual Display Boards
Section 101400 – Interior Signage
Section 100402 – Exterior Signage and Identifying Graphics
Section 102113.19 – Plastic Toilet Compartments
Section 102800 – Toilet, Bath and Laundry Accessories
Section 104400 – Fire Protection Specialties
Section 105102 – Locker Refurbishing
Section 105113 – Metal Lockers
Section 122413 – Roller Window Shades

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

Section 033000 – Cast In Place Concrete (As it relates to saw cutting and replacement of interior concrete)
Section 087100 – Door Hardware (As it relates to bid divisions 081213 and 081416)
Section 078413 – Penetration Firestopping (As it relates to this Bid Division)
Section 079200 – Joint Sealants (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:

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.
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.)**

Bid Division: 060000 – General Trades

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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 two (2) weeks 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. Provide wood base for lockers, if required.
10. Remove items indicated: clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

Bid Division: 060000 – General Trades

11. Remove and legally dispose of items not indicated to be reinstalled, salvaged or to remain the Owner's property.
12. Install all doorframes and coordinate with the mason contractor.
13. Cover all countertops with double-layered corrugated cardboard.
14. Clean and dust all casework upon completion.
15. Clean, prep, and adjust all equipment immediately prior to Owner occupancy.
16. Patch walls after removal of existing tack strips and tack boards that are not covered by new strips or boards. Walls shall be brought to a surface ready to receive new paint.
17. Patch all demolished areas and items affected by demolition to a condition ready to receive finishes and finish materials.
18. Furnish and install all joint sealants and fire stopping 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.
19. Contractor shall broom sweep building daily.
20. Provide all temporary enclosures as required, review demo drawings throughout the duration of construction.
21. 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.
22. Provide all wood framing, plywood and nailers as shown and specified.
23. Review alternates.
24. 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.
25. 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. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Provide all selective demolition as indicated on drawings.
4. Provide all demo of existing ceiling areas as identified in drawings.
5. Provide all demo of existing gypsum board assemblies as identified.
6. Furnish and Install all bathroom accessories. Owner to provide toilet accessories to be installed by this bid division.
7. 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.
8. Furnish and install all hollow metal frames, doors, and door hardware.
9. Furnish and install all wood flush doors as identified in drawings. Refer to door schedule.

Bid Division: 060000 – General Trades

10. Provide and install all signage.
11. Provide and install all required access panels.
12. Provide and install all marker boards, tack boards, visual display boards as indicated in the drawings and specifications.
13. Furnish and install all sheathing as required, including fire-rated and treated as documented.
14. Provide all required temporary protection and temporary enclosures as need throughout project.
15. This contractor is required to provide all fire extinguishers and fire extinguisher cabinets as documented.
16. Provide and install all roller shades as documented.
17. Refer to all door schedules for related work.
18. Coordinate and conduct pre-installation meeting with owner, CM, and architect for all door hardware.
19. Refer to door hardware specifications for cores and keys to be supplied by this bid division.
20. **Provide a $5,000 allowance as part of your base bid for any unforeseen general trades work, or saw cutting and replacement of concrete work that is not already indicated on the drawings.**
21. **Provide an allowance of 100 man hours of general clean up, to be used at the direction of the CM Field Manager as part of base bid.**

22. Floyd Elementary

a. Refer to demo notes 12-16 on page D-A100 by this bid division.
b. Refer to construction notes 5 and 10 on page D-A101.
c. **Provide Alternate #1 price to sand and paint existing lockers per construction note 6 on page D-A101.**
d. This bid division is responsible for demo notes 1-3, 5,6, 8, 10-19 on page D-A103
e. This bid division is responsible for construction notes 1-3, 5, 8, 10 on page D-A103.
f. Refer to page D-A601 for casework and shelving elevations and details for work by this bid division.
g. This bid division is responsible for die-cast aluminum letters on the face of the canopy see page D-A201.
h. Refer to addendum one to be issued the week of 11/2 regarding change of door scope of work.

23. Pine River Elementary

a. Refer to demo notes 2,4, and 6 on page E-A101.
b. See notes on Demo reflected ceiling plan for wall tile demo on page E-A101. Coordinate with mechanical for scope of removal.
c. Refer to demo notes 1, 3-6, 9-11 by this bid division on page E-A102.
d. See construction notes 3, 4, 6-10 on page E-A103 to be completed by this bid division.
e. Refer to door and frame schedule for hollow metal frames and wood door needs.
f. Refer to page E-A601 for casework requirements by this bid division.
g. This contractor is responsible for all plywood sheathing for wall assemblies. See details on page E-S100.

24. Bullock Creek High School

a. Provide all saw cutting and removal of existing concrete slabs as indicated on the architectural, plumbing, and electrical drawings. Coordinate with plumbing and electrical contractors prior to commencement of the work. If saw cutting and removal of floor slabs and walls is not shown on the drawings but required for the completion of the work by other trades, then this work will be the responsibility of those other trades.
b. Refer to kitchen plans for infill of existing recessed floor area to be this Bid Division responsibility.
c. This bid division is responsible for all interior concrete and masonry work. (High School only)
d. Provide all required masonry toothing and patching of CMU and brick.
e. Responsible for Demo notes 1, 2, 4, 5, 11-13, and 14 on page A-A101.
f. Refer to “F” wing toilet enlarged plan notes for partitions, and enclosures to remain.
g. Responsible for construction notes 2, 3, 6, 8, 9 on page A-A102.
h. Refer to wall type legend and notes for CMU walls to be installed.

Bid Division: 060000 – General Trades

i. Refer to steel column section 7 on page A-A104 for required column foundation work. Saw cutting of floor, CMU block, and concrete foundation work is the responsibility of this bid division.

Excludes:

1. All demolition of conduits, ducts, pipes, fixtures, etc. (demolition required for all mechanical, plumbing, and electrical work) is to be performed by the specific mechanical, plumbing, and electrical contractors unless otherwise noted above.
2. Hardware for aluminum entries
3. Aluminum frames

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 060000

Cold Formed Metal Trusses	054400-1	Metal Trusses - PD SD	Cold Formed Metal Trusses - product data and shop drawings see	Product Data
Rough Carpentry	061000-1	Rough Carpentry - PD	Rough Carpentry - Product data on wood materials see spec	Product Data
Finish carpentry	062000-1	Finish Carpentry - PD SD	Finish Carpentry - product data and shop drawings	Product Data
Arch Wood Casework	064100-1	Wood Casework - PD SD	Wood Casework - product data and shop drawings - see spec	Product Data
Arch Wood Casework	064100-2	Wood Casework - Samples	Wood Casework - Samples of plastic laminate	Samples
Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Hollow Metal Frames	081213-1	HM Frames - PD SD	Hollow Metal Frames - product data and shop drawings see spec	Product Data
Flush Wood Doors	081416-1	Flush Wood Doors - PD SD	Flush Wood Doors - product data and shop drawings see spec	Product Data
Flush Wood Doors	081416-2	Flush Wood Doors - Samples	Flush Wood Doors - samples of door veneer and grain and colors	Samples
Flush Wood Doors	081416-3	Flush Wood Doors - Warranty	Flush Wood Doors - Manufacturer Warranty see spec	Close Out
Door Hardware	087100-1	Door Hardware - PD SD	Door Hardware - product data, keying/hardware schedule and sh	Product Data
Visual Display Boards	101101-1	Vis Dis Play - PD SD	Visual Display Boards - Product data and shops see spec	Product Data
Visual Display Boards	101101-2	Vis Dis Play - Samples	Visual Display Boards - Samples of color and texture of enamel ste	Samples
Interior Signage	101400-1	Interior Signage - PD SD	Interior Signage - product data and shop drawings and schedule	Product Data
Interior Signage	101400-2	Interior Signage - Samples	Interior Signage - Samples of each type of sign and size - see spec	Samples
Exterior Signage and Identif	101402-1	Ex Signs and ID Gaphice - PD SD	Exterior Signage and Identifying Graphics - Product data and Shop	Product Data
Exterior Signage and Identif	101402-2	Ex Signs and ID Gaphice - Samples	Exterior Signage and Identifying Graphics - Samples of colors and f	Samples
Plastic Toilet Compartments	102113.19-1	Toilet Comp - PD SD	Plastic Toilet Compartments - Product data and shop drawings see	Product Data
Plastic Toilet Compartments	102113.19-2	Toilet Comp - Samples	Plastic Toilet Compartments - 2 samples of partition panels, panel	Samples
Toilet, Bath and Laundry Ac	102800-1	Toil Bth and Laun - PD	Toilet, Bath and Laundry Accessories - product data	Product Data
Fire Protection Specialties	104400-1	Fire Prot Spec - PD SD	Fire Protection Specialties - product data and shop drawings - see	Product Data
Locker Refurbishing	105102-1	Locker Refurb - PD SD	Locker Refurbishing - product data and shop drawings - see spec	Product Data
Locker Refurbishing	105102-2	Locker Refurb - samples	Locker Refurbishing - samples of color being used see spec	Samples
Metal Lockers	105113-1	Metal Lockers - PD SD	Metal Lockers - product data and shop drawings see spec	Product Data
Metal Lockers	105113-2	Metal Lockers - Samples	Metal Lockers - samples of each color scheduled	Samples
Roller Window Shades	122401-1	Roller Win Shades - PD SD	Roller Window Shades - product data, schedule and shop drawing	Product Data
Roller Window Shades	122401-2	Roller Win Shades - samples	Roller Window Shades - Samples of colors see spec	Samples
General Trades - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
General Trades - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
General Trades - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
General Trades - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
General Trades - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
General Trades - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
General Trades - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
General Trades - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
General Trades - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
General Trades - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
General Trades - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
General Trades - Close Out	087100-3	Door Hardware - Manuals	Door Hardware - Manuals	Close Out

General Trades - Close Out	087100-3	Door Hardware - Warranty	Door Hardware - Special warranties - see spec	Close Out
General Trades - Close Out	101101-3	Vis Dis Play - Maint data	Visual Display Boards -maintenance data	Close Out
General Trades - Close Out	101101-4	Vis Dis Play - Warranty	Visual Display Boards -50 yr warranty for markerboard surface - se	Close Out
General Trades - Close Out	102113.19-3	Toilet Comp - Warranty	Plastic Toilet Compartments -manufacturers warranty 15 year - se	Close Out
General Trades - Close Out	122401-3	Roller Win Shades - Manual	Roller Window Shades - O&M Manuals - see spec	Close Out
General Trades - Close Out	122401-4	Roller Win Shades - warranty	Roller Window Shades - Manufacturers warranty - see spec	Close Out
General Trades - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
General Trades - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
General Trades - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
General Trades - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
General Trades - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
General Trades - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
General Trades - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
General Trades - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
General Trades - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
General Trades - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 075000 Roofing

Bid to Include:

Total Responsibility for Specification Sections:

Section 074113 – Metal Roof Panels
Section 074201 – Aluminum Composite Panels
Section 074212 – Metal Wall Panels
Section 075400 – Thermoplastic Membrane Roofing
Section 076200 – Sheet Metal Flashing and Trim
Section 077253 – Snow Guards

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

Section 024119 – Selective Demolition (as it relates to tying into the existing building)
Section 072100 – Thermal Insulation (As it relates to this bid division)
Section 078413 – Penetration Firestopping (As it relates to this Bid Division)
Section 079200 – Joint Sealants (As it pertains to roofing)

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 & watertight 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 makes a mistake by installing their product on another Contractor's obvious faulty work will assume responsibility for repair of said work.

Bid Division: 075000 Roofing

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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Remove and replace all existing rain conductors and splash blocks.
2. Demolition, removal and proper legal off-site disposal of existing roofing and sub roofing where new additions tie-in.
3. Installation of roof edging.
4. Repair roofing around new and revised vent stacks throughout the building, as required.
5. Cut and tie back into existing building roofing and flashing (i.e., cut back existing roofs as needed), rework and repair metal soffit material as needed for tie-in.
6. Maintain weather protection during tie-in.
7. Furnish and install pipe stands as required by mechanical and electrical trades.
8. Furnish and install all joint sealants and fire stopping as indicated in specifications and drawings.
9. Responsible for all roof trim.
10. Supply and install all required fasteners.
11. Coordinate all finishing connections with appropriate contractors.
12. Coordinate all roof penetrations with appropriate contractors, flash and seal. (Please review roof plans, mechanical plans, and electrical plans.)
13. Remove all snow, ice, and other weather-related items for proper installation of roofing system.
14. Protect Acoustical roof deck prior to application of tar.

Bid Division: 075000 Roofing

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. Provide all required demolition of roofing materials.
4. 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.
5. Furnish and install all materials for patching, infill, and repairs of existing roofs as documented.
6. Furnish and install all materials for a complete installation of the membrane roof systems, including all insulation, fascia sheet metal materials, and top of wall flashings as documented.
7. Tie-in all roof drains to achieve proper flashing and drainage.
8. Provide all new roof openings in existing roofs where new mechanical work occurs.
9. Provide and install walkway pads as indicated in the drawings and specifications.
10. 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.
11. This contractor shall provide daily clean-up of all debris generated by this contractor's daily work. This is not limited to the immediate area, but should also include clean-up of all dust and debris that affected adjoining areas.
12. **Pine River Elementary**
    a. This bid division is responsible for all metal fascia shown on elevation drawing page E-A201.
    b. Responsible for demo of existing flashing and metal fascia for tie-in of new construction
    c. Refer to all wall section details on page E-A301.
    d. See Bulkhead detail on page E-A302 for roof tie-in from existing to new construction.
    e. This bid division is responsible for new movable roof guardrail. Refer to specifications and drawings.
13. **Floyd Elementary**
    a. Refer to pages D-A104 and D-A201 for all roofing, trim, soffit, and fascia needs for new canopy work by this bid division
    b. General trades responsible for aluminum letters.

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 070000

Thermal Insulation	072100-1	Thermal Ins - PD	Thermal Insulation - Product Data	Product Data
Metal Roof Panels	074113-1	Metal Roof Panels - PD SD	Metal Roof Panels - product data and shop drawings - seee spec	Product Data
Metal Roof Panels	074113-2	Metal Roof Panels - Samples	Metal Roof Panels - Samplesfor each roof system - colors and patt	Samples
Alum Composite Panels	074201-1	Alum Comp Panels - PD SD	Aluminum Composite Panels - product data and shop drawings se	Product Data
Alum Composite Panels	074201-2	Alum Comp Panels - Samples	Aluminum Composite Panels - Samples of panels, and colors	Samples
Metal Wall Panels	074213-1	Wall Panels - PD SD	Metal Wall Panels - product data and shop drawings - see spec	Product Data
Metal Wall Panels	074213-2	Wall Panels - Samples	Metal Wall Panels - Samples of wall panel and soffit panel and fini	Samples
Therm Membrane Roofing	075400-1	Membrane Roofing - PD SD	Thermoplastic Membrane Roofing - Product data and shop drawir	Product Data
Therm Membrane Roofing	075400-2	Membrane Roofing - Samples	Thermoplastic Membrane Roofing - Samples of roof membrane co	Samples
Sheet Metal Flashing and Tr	076200-1	SM Flas/Trm - PD SD	Sheet Metal Flashing and Trim - product data and shop drawings s	Product Data
Sheet Metal Flashing and Tr	076200-2	SM Flas/Trm - Samples	Sheet Metal Flashing and Trim - Samples of metal finish color	Samples
Snow Guards	077253-1	Snow Guards - PD SD	Snow Guards - product data and shop drawings - seee spec	Product Data
Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Roofing - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Roofing - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Roofing - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Roofing - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Roofing - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Roofing - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Roofing - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Roofing - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Roofing - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Roofing - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Roofing - Close Out	074113-3	Metal Roof Panels - Warranty	Metal Roof Panels - 20 year manufacturer warranty and special 5	Close Out
Roofing - Close Out	074201-3	Alum Comp Panels - Warranty	Aluminum Composite Panels - 20 yr finish warranty - see spec	Close Out
Roofing - Close Out	074213-3	Wall Panels - Warranty	Metal Wall Panels - 20 yr warranty on finishes see spec	Close Out
Roofing - Close Out	075400-3	Membrane Roofing - Warranty	Thermoplastic Membrane Roofing - 20 yr manufacturers warranty	Close Out
Roofing - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Roofing - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Roofing - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Roofing - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Roofing - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Roofing - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Roofing - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Roofing - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Roofing - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Roofing - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Roofing - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 084000 – Glass & Glazing (only at Pine River Addition)

Bid to Include:

Total Responsibility for Specification Sections:

Section 081601 – Insulated Composite Doors
Section 084113 – Aluminum Framed Storefronts
Section 085113 – Aluminum Windows
Section 087101 – Door Hardware Schedule
Section 088000 – Glazing 084000

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 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 makes 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.

Bid Division: 084000 – Glass & Glazing

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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Provide and install all hardware required for this Bid Division.
2. Field measure 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 punch list).
6. Furnish and install all caulking and sealing associated 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.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.

Bid Division: 084000 – Glass & Glazing

3. Furnish and install all aluminum storefront, frames, windows, doors and all associated window and door hardware associated with FRP /Aluminum Hybrid doors and windows.
4. Provide pull ropes in door frames for access control wiring installation. Consult with the construction manager and access control contractor prior to installation.
5. Furnish and install all caulking and sealants as it pertains to this bid division.
6. 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.
7. Provide and install all glass, per drawings.
8. Refer to all door and frame schedules for any insulated composite and aluminum doors and frames as well as all glazing required by this bid division.
9. Coordinate and conduct pre-installation meeting with owner, CM, and architect for all door hardware.
10. Refer to door hardware specifications for cores and keys to be supplied by this bid division.
11. Refer to Pine River Elementary drawings for scope of work.

Excludes:

1. Wood doors and Hollow metal frames to be covered 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-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 084000

Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Insulated Composite Doors	081601-1	Ins Comp Doors - PD SD	Insulated Composite Doors - product data and shop drawings see	Product Data
Insulated Composite Doors	081601-2	Ins Comp Doors - Samples	Insulated Composite Doors - samples of colors and finishes see sp	Samples
Aluminum Framed Storefro	084313-1	Alum Storefronts - PD SD	Alum Storefronts - product data, shop drawings and schedule	Product Data
Aluminum Framed Storefro	084313-2	Alum Storefronts - Samples	Alum Storefronts - samples of finish alum surface - see spec	Samples
Aluminum Windows	085113-1	Alum Windows - PD SD	Aluminum Windows - product data and shop drawings - see spec	Product Data
Door Hardware	087100-1	Door Hardware - PD SD	Door Hardware - product data, keying/hardware schedule and sh	Product Data
Glazing	088000-1	Glazing - PD	Glazing - product data for glass and glazing compounds	Product Data
Glass & Glazing - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Glass & Glazing - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Glass & Glazing - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Glass & Glazing - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Glass & Glazing - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Glass & Glazing - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Glass & Glazing - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Glass & Glazing - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Glass & Glazing - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Glass & Glazing - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Glass & Glazing - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Glass & Glazing - Close Out	081601-3	Ins Comp Doors - Warranty	Insulated Composite Doors - 10 yr manufacturers warranty	Close Out
Glass & Glazing - Close Out	084313-3	Alum Storefronts -Warranty	Alum Storefronts - 5 yr manufacturers warranty on glass seal - see	Close Out
Glass & Glazing - Close Out	085113-2	Alum Windows - Warranty	Aluminum Windows - 5 yr manufacturer warranty - see spec	Close Out
Glass & Glazing - Close Out	087100-3	Door Hardware - Manuals	Door Hardware - Manuals	Close Out
Glass & Glazing - Close Out	087100-3	Door Hardware - Warranty	Door Hardware - Special warranties - see spec	Close Out
Glass & Glazing - Close Out	088000-3	Glazing - Warranty	Glazing - 5 yr warranty for insulating lass and laminated glass - see	Close Out
Glass & Glazing - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Glass & Glazing - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Glass & Glazing - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Glass & Glazing - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Glass & Glazing - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Glass & Glazing - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Glass & Glazing - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Glass & Glazing - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Glass & Glazing - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Glass & Glazing - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 091000 – Drywall, Insulation & Acoustical

Bid to Include:

Total Responsibility for Specification Sections:

Section 054000 – Cold-Formed Metal Framing
Section 092116 – Gypsum Board Assemblies
Section 095100 – Acoustical Ceilings
Section 095421 – Metal Pan Ceilings

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

Section 072100 – Thermal Insulation (As it relates to this scope of work)
Section 078413 – Penetration Firestopping (As it relates to this scope of work)
Section 079200 – Joint Sealants (Miscellaneous caulking, control joints, etc.)

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 makes 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.

Bid Division: 091000 – Drywall, Insulation & Acoustical

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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Divisions Inclusions:

1. All metal stud framing and drywall for bulkheads and light coves.
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. Patch existing remodeled areas as required.
9. Supply and install fire rated gypsum board tight to roof deck as indicated.
10. Expansion and control joints as required by design or product manufacturer.
11. Prior to layout of ceilings, contractor to accept humidity and temperature levels in the building.
12. Provide all drywall and plaster on metal as well as wood as indicated.
13. The on-site foreman for this Bid Division must be able to communicate with all employees and the Construction Manager's staff.
14. Follow room finish schedule.
15. Provide all vapor barriers as required by design and product manufacturer.
16. Provide all nailers and underlayment.
17. Provide all trim as it relates to Acoustical Ceiling System.
18. Provide all fasteners.
19. Furnish and install all caulking required for the work of this Bid Division.
20. Replacement and/or repair of defective and/or misaligned material installed by this contractor.
21. To repair any adjacent material damaged in the execution of the above listed work.

Bid Division: 091000 – Drywall, Insulation & Acoustical

22. Provide smooth transition from existing work to new work.
23. Install louvers and access panels furnished by each architectural, mechanical and electrical contractor in locations encased in this contractor's work.
24. Provide all caulking and sealants for plasterwork or drywall as required.
25. Provide all EIFS work per manufacturer recommendations.
26. 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.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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.
3. Furnish and install all required light-gauge metal framing material and drywall, glass mat sheathing, etc. at all walls, ceilings, bulkheads, parapets, etc.
4. Provide all metal framing, drywall, and insulation at all walls, as documented, including rigid insulation.
5. Furnish and install all acoustical ceiling systems, as documented.
6. Furnish and install all materials for the bulkheads as documented.
7. **Bullock Creek High School**
    a. Refer to notes on page A-A103 for header above ceilings to be installed by this bid division.
    b. Refer to notes on page A-A104 for gypsum board column wrap in kitchen area.
    c. Refer to notes on page A-A104 for reflected ceiling plan requirements of this bid division. Coordinate with bid division 222300 for work around new kitchen hood system.
8. **Floyd Elementary**
    a. See reflected ceiling plan on page D-A103 for work by this bid division.
    b. See notes about patching existing gypsum board ceilings on page D-A103.
9. **Pine River Elementary**
    a. See details on page E-S300 for metal stud framing and insulation responsibilities by this bid division.
    b. See reflected ceiling plan on page E-A101 for work by this bid division. Coordinate with bid division 222300 for work around new kitchen hood system.
    c. This bid division is responsible for demo note 7 on page E-A102.
    d. Responsible for all new insulation work.
    e. See construction note 1 on page E-A103 for this bid division work. Refer to details for extent of metal stud wall work.
    f. See ceiling construction notes on page E-A103 for work by this bid division.

Excludes:

1. Ceiling tile demo to be removed by general trades bid division 060000**.**
2. Wall assembly at Bullock Creek Elementary to be completed by general trades bid division 060000.

Bid Division: 091000 – Drywall, Insulation & Acoustical

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. Expedite communication and follow-up as required.

END OF BID DIVISION 091000

Cold Formed Metal Framing	054000-1	Cold Formed Mtl Frm - PD SD	Cold Formed Metal Framing - product data, shop drawings see spe
Thermal Insulation	072100-1	Thermal Ins - PD	Thermal Insulation - Product Data
Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Gypsum Board Assemblies	092116-1	Gypsum Board - PD	Gypsum Board - product data
Acoustical Ceilings	095100-1	Acoustical Ceilings - PD	Acoustical Ceilings - product data
Metal Pan Ceilings	095421-1	Pan Ceilings - PD	Metal Pan Ceilings - product data
Drywall, Ins & Acoust - Start	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Drywall, Ins & Acoust - Start	Start Up	02 Schedule of Values	Schedule of Values
Drywall, Ins & Acoust - Start	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Drywall, Ins & Acoust - Start	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Drywall, Ins & Acoust - Start	Start Up	05 Insurance w/binders	Insurance w/binders
Drywall, Ins & Acoust - Start	Start Up	06 Contact/Employee List	Contact/Employee List
Drywall, Ins & Acoust - Start	Start Up	07 Safety Policy	Safety Policy
Drywall, Ins & Acoust - Start	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Drywall, Ins & Acoust - Start	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Drywall, Ins & Acoust - Start	Start Up	10 AHERA Notifications	AHERA Notifications
Drywall, Ins & Acoust - Close	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Drywall, Ins & Acoust - Close	095100-3	Acoustical Ceilings - Extra Material	Acoustical Ceilings - Extra Materials - Furnish 2% of amoun installe
Drywall, Ins & Acoust - Close	095421-3	Pan Ceilings - Extra Materials	Metal Pan Ceilings - Extra Material - furnish acoustical Units 2% of
Drywall, Ins & Acoust - Close	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Drywall, Ins & Acoust - Close	Close Out	12 Consent of Surety	Consent of Surety
Drywall, Ins & Acoust - Close	Close Out	13 Substantial Completion	Substantial Completion
Drywall, Ins & Acoust - Close	Close Out	14 Hazardous Material Form	Hazardous Material Form
Drywall, Ins & Acoust - Close	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Drywall, Ins & Acoust - Close	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Drywall, Ins & Acoust - Close	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Drywall, Ins & Acoust - Close	Close Out	18 As Built Drawings	As Built Drawings with red lines
Drywall, Ins & Acoust - Close	Close Out	18 Insurance up to date	Insurance up to date
Drywall, Ins & Acoust - Close	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 096500 – Flooring

Bid to Include:

Total Responsibility for Specification Sections:

Section 090561 – Existing Flooring Removal and Preparation
Section 096500 – Resilient Flooring
Section 096700 – Resinous Flooring
Section 096813 – Tile Carpeting

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)

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. **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 makes 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.

Bid Division: 096500 – Flooring

12. Must provide all submittals within 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Preparation of existing 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. Clean and prepare floor including leveling and filling of voids prior to starting work.
7. Provide all floor striping and graphics, if required.
8. Vacuum and spot clean carpet prior to Owner occupancy.
9. Provide and install all required base.
10. Transition and provider stripes.
11. Furnish and install all caulking required for the work of this Bid Division.
12. Provide Owner with additional flooring for each type, color, pattern and size installed. (Per specifications)
13. Replacement and/or repair of defective and/or misaligned material installed by this contractor.
14. To repair any adjacent material damaged in the execution of the above listed work.
15. All adhesives.
16. Provide and install thresholds as required.

Bid Division: 096500 – Flooring

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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.
3. Grind, clean, and prepare floors to receive new flooring, including leveling and filling of voids prior to starting work, and in accordance with specifications and manufacturer's requirements. This contractor is responsible for furnishing and installing leveling materials to create a smooth finish flooring transition at dissimilar flooring materials or new to existing slabs.
4. Furnish and install all required transition strips.
5. Furnish and install all flooring and base per Finish Schedules.

6. **Bullock Creek High School**
    a. See demo note 15 on page A-A101 for work by this bid division.
    b. Refer to note on A-A101 kitchen proposed plan for quarry tile install. Infill to be completed by others.
    c. Refer to construction note 4 and 7 on page A-A102 for work by this bid division.
    d. Refer to room finish schedule on page A-A601.
7. **Floyd Elementary**
    a. Refer to demo note 13 on page D-A100 for flooring demo by this bid division.
    b. Refer to construction note 7 on page D-A103 for self-leveling work in prep for new floors.
    c. See Partial floor plan note on patching existing VCT floor on page D-A103.
    d. Refer to room finish schedule on page D-A601 for work by this bid division.
8. **Pine River**
    a. See construction note 2 on page E-A101 for quarry tile work to be completed by this bid division.

Excludes:

1. Flooring work at Pine River Elementary for stained polished concrete to be completed by Bid Division 030100.

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 096500

Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec
Flooring Removal and Prep	090561-1	Flr Removal and Prep - PD	Floor Removal and Prep - product data testing
Resilient Flooring	096500-1	Res Flooring - PD	Resilient Flooring - Product data
Resilient Flooring	096500-2	Res Flooring - Samples	Resilient Flooring - Samples of each color
Resinous Floor Coating	096700-1	Res Floor Coat - PD	Resinous Floor Coating - Product data
Resinous Floor Coating	096700-2	Res Floor Coat - Samples	Resinous Floor Coating - Samples of finish texture
Tile Carpeting	096813-1	Tile Carpeting - PD	Tile Carpeting - Product data
Tile Carpeting	096813-2	Tile Carpeting - Samples	Tile Carpeting - Samples of color and pattern - see spec
Flooring - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed
Flooring - Start Up	Start Up	02 Schedule of Values	Schedule of Values
Flooring - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned
Flooring - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds
Flooring - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders
Flooring - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List
Flooring - Start Up	Start Up	07 Safety Policy	Safety Policy
Flooring - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)
Flooring - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form
Flooring - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications
Flooring - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec
Flooring - Close Out	096500-3	Res Flooring - Extra Materials	Resilient Flooring - Extra Materials - 35 sq feet of each type and co
Flooring - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee
Flooring - Close Out	Close Out	12 Consent of Surety	Consent of Surety
Flooring - Close Out	Close Out	13 Substantial Completion	Substantial Completion
Flooring - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form
Flooring - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits
Flooring - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner
Flooring - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned
Flooring - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines
Flooring - Close Out	Close Out	18 Insurance up to date	Insurance up to date
Flooring - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off

Bid Division: 099000 – Painting

Bid to Include:

Total Responsibility for Specification Sections:

Section 099000 – Painting and Coating
Section 099600 – High-Performance Coatings

Limited Responsibility for Specification Sections (as it relates to work in 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 makes 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.

Bid Division: 099000 -- Painting

12. Must provide all submittals within 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

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 any and all dissimilar surfaces including door and window frames, CMU & Drywall.
15. Clean, dust and dirt off bar joist, deck and ductwork prior to painting.

Bid Division: 099000 – Painting

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
3. 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.
4. Paint all gas lines as documented.
5. Provide complete prep and painting of existing surfaces as documented.
6. Provide complete prep and painting of existing and new exposed steel materials as documented.
7. Prep and paint all exposed roof framing, ductwork, conduits and any other materials as documented.
8. Paint all exposed drywall and CMU as documented.
9. Paint all hollow metal frames and doors as documented.
10. Paint all bulkheads.

11. Bullock Creek High School

a. See notes on page A-A102 for existing enclosure and convection heater covers to be painted.
b. Construction notes 10 and 11 on page A-A102 are the responsibility of this bid division.
c. Refer to notes on page A-A103 for touch up painting needs.
d. See note on page A-A103 for painting of existing bulkheads and ceilings throughout for "F" wing toilet rooms.
e. Refer to room finish schedule on page A-A601 and see also toilet room elevations for High-Performance Coating typical layout. Paint lines to align with masonry coursing.
f. This bid division responsible for wall prep and paint of all high-performance coatings.

12. Floyd Elementary

a. This bid division responsible for construction note 9 on page D-A101.
b. Refer to room finish schedule and specifications for all finishes.
c. Refer to notes on page D-A201 for steel work on canopy to be painted by this bid division.

13. Pine River Elementary

a. This contractor is responsible for any touch-up paint required.
b. Refer to the room finish schedule on page E-A601 for work by this bid division.

Bid Division: 099000 – Painting

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 099000

Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Painting and Coating	099000-1	Painting and Coating - PD	Painting and Coatings - product data see spec	Product Data
Painting and Coating	099000-2	Painting and Coating - Samples	Painting and Coatings - samples of each color and texture	Samples
High Performance Coatings	099600-1	High Perf Coating - PD	High Performance Coatings - product data see spec	Product Data
High Performance Coatings	099600-2	High Perf Coating - Samples	High Performance Coatings - Samples of each colors and textures	Samples
Painting - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Painting - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Painting - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Painting - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Painting - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Painting - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Painting - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Painting - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Painting - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Painting - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Painting - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Painting - Close Out	099000-3	Painting and Coating - Extra material	Painting and Coatings - Extra material - furnish paint and coatings	Close Out
Painting - Close Out	099600-3	High Perf Coating - Extra Materials	High Performance Coatings - Extra Material - furnish extra coating	Close Out
Painting - Close Out	099600-3	High Perf Coating - Warranty	High Performance Coatings - 5 yr warranty - see spec	Close Out
Painting - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Painting - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Painting - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Painting - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Painting - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Painting - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Painting - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Painting - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Painting - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Painting - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

Bid Division: 222300 – Plumbing & HVAC Systems

Bid to Include:

Total Responsibility for Specification Sections:

Section 200000 – Basic Mechanical Requirements
Section 220553 – Identification for Plumbing Piping and Equipment
Section 220719 – Plumbing Piping Installation
Section 220800 – Commissioning of Plumbing
Section 221005 – Plumbing Piping
Section 221006 – Plumbing Piping Specifications
Section 224000 – Plumbing Fixtures
Section 230593 – Testing, Adjusting and Balancing for HVAC
Section 230713 – Duct Insulation
Section 230719 – HVAC Piping Insulation
Section 230800 – Commissioning of HVAC
Section 230900 – Building Management and Control System
Section 230901 – Control Sequences
Section 232113 – Hydronic Piping
Section 232114 – Hydronic Specialties
Section 232123 – Hydronic Pumps
Section 232300 – Refrigerant Piping
Section 232500 – HVAC Water Treatment
Section 233100 – HVAC Ducts and Casings
Section 233300 – Air Duct Accessories
Section 233423 – HVAC Power Ventilators
Section 233700 – Air Outlets and Inlets
Section 233813 – Commercial-Kitchen Hoods
Section 237313 – Modular Central-Station Air-Handling Units
Section 236313 – Air Cooled Refrigerant Condensers
Section 237413 – Packaged Outdoor Central Station Air Handling Units
Section 237414 – Packaged Outdoor Central Air Handling Units
Section 238101 – Terminal Heat Transfer Units

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

Section 024200 – Selective Demolition (as it pertains to mechanical and plumbing demolition)
Section 078413 – Penetration Firestopping (As it relates to this Bid Division)
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:

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

Bid Division: 222300 – Plumbing & HVAC Systems

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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: 222300 – Plumbing & HVAC Systems

23. **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.**

Division Inclusions:

1. Concrete Patching for mechanical and electrical trades by Bid Division 030100
2. Selective Demolition (concrete floors, etc.).
3. No concrete is to be installed until verification of acceptable density testing. 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.
4. Provide all blocking required for plumbing fixture mounting.
5. Perform all connections between site utilities and building, coordinate with site contractor on utilities.
6. Patch floors with concrete, where existing fixtures and pipe are removed and capped.
7. Removal of all plumbing and heating fixtures.
8. Provide proper repair of all ceilings, walls, floors, etc., when installing new piping fixtures and hangers.
9. Furnish and install all fixtures in cabinetry as required.
10. Provide all final connections and hook-ups for kitchen equipment.
11. Furnish all louvers and access panels to masonry and drywall contractors for installation.
12. 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).
13. Patch all demolished areas and items affected by HVAC & plumbing demolition to a condition ready to receive finishes and finish materials (finish materials by others, i.e. carpet, tile paint, etc.).
14. Perform all excavating, backfill, and compaction required for the work of this bid division.
15. Furnish and install duct detectors, back draft dampers, etc. as shown and specified, and/or required by Code.
16. Perform all demolition necessary for the completion of the work of this Bid Division as shown and specified.
17. Provide all final plumbing hook-ups to all plumbing related fixtures and equipment.
18. Provide coordination with roofing and metal contractors for roof penetrations, equipment rails and pipe boots including layouts.
19. Maintain fire rating in all walls penetrated.
20. Remove spoils from site.
21. Provide all required layout and verify that no conflict occurs with other trades.
22. Furnish operating and maintenance manuals.
23. Provide record and as-built drawings.
24. Provide all necessary connection between temperature control and instrumentation devices and equipment to be controlled.
25. Provide roof curbs for rooftop equipment.
26. Provide all permits required.
27. 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.
28. Provide temporary water distribution as required.
29. Provide all State Certification for equipment (boilers, etc.).
30. Refer to all equipment schedules for additional equipment to be furnished and installed (including kitchen equipment and kitchen equipment schedules).
31. Abandoning of retired plumbing.
32. Provide testing, adjusting and balancing of Mechanical and Plumbing systems.
33. Provide copies of the test and balance report to the Construction Manager within (10) calendar days of completing the test and balance field procedures.
34. Meet with the Architect, Construction Manager, plumbing/HVAC contractor, temperature control contractor, and Owner's representative within (10) calendar days of providing the written test and balance report to review the results of the test and balance procedures.

Bid Division: 222300 – Plumbing & HVAC Systems

35. Furnish test and balance reports.
36. Contractor shall coordinate phased delivery of all pre-purchased equipment with supplier.
37. Contractor shall maintain existing HVAC systems in fully functional order in occupied areas of the building throughout the duration of the project.
38. 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.
39. Remove, clean and reinstall all existing grids, vents, registers and diffusers including those mounted in metal ceiling grid systems.
40. All HVAC equipment is to be completed with all motor starters, disconnects or other items to allow for the proper operation of the system.
41. Disconnect all roof top units to allow roofing contractor to raise and replace flashings as required.
42. Provide start-up training with Owner Representative, Architect and Construction Manager for all equipment installed.
43. Final installation and all work by this bid division must comply with governing building and life safety codes.
44. Provide water test approval two weeks prior to Owner Occupancy.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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.
3. Coordinate with the Schools Controls contractor (Honeywell) for all controls work.
4. **This contractor will be responsible for providing coordination with the future commissioning agent and attending all of the required commissioning meetings. Refer to specifications sections 220800 and 230800 as included for reference. The commissioning work will be provided by a third-party company and will coordinate with this bid division to complete and verify all commissioning needs for this project.**
5. Provide owner training on all new equipment and systems once systems are operational.
6. Include cost for all required permits in bid proposal and coordinate all required inspections.
7. Provide all required plumbing and HVAC demolition as documented.
8. Furnish and install all new plumbing fixtures as documented.
9. Removal and reinstallation of all salvaged plumbing fixtures by this Bid Division.
10. Furnish and install all new and temporary water and gas piping and connections as required by this project.
11. All plumbing and HVAC installations shall meet all required governing requirements.
12. Furnish and install all prefabricated curbs and/or wood material as required for mechanical equipment curbing
13. Coordinate all access panel locations with Bid Division 060000.
14. Coordinate all roof penetration locations with Bid Division 075000.
15. Furnish and install all required gas piping.
16. Furnish and install all required hydronic piping.
17. Furnish and install all required refrigerant lines.
18. Furnish and install all required waste, water supply, and vent piping.
19. Responsible for sanitary hook-up within 5' of the exterior of the building.
20. Furnish and install all new hose bibs as indicated.

Bid Division: 222300 – Plumbing & HVAC Systems

21. Final installation of all casework gas, domestic water, and sanitary hook-ups.
22. Provide all required plumbing and HVAC insulation.
23. Provide all required test and balance work.
24. Furnish and install duct detectors. Final connection and certification will be by fire alarm contractor underbid division 260000 contractor.
25. Fire seal any penetrations to maintain wall integrity. All corridor walls shall be considered rated walls.
26. Furnish and install all required fire dampers.
27. Provide all required temperature control work for a complete operational system.
28. Provide complete Owner's Training of Temperature Control System.
29. Coordinate with Bid Division 050000 for location of ALL roof-mounted units.
30. This contractor will be required to provide information pertaining to the energy incentive program of the utility company.

31. Pine River Elementary

1. Refer to all mechanical and plumbing schedules for work by this bid division.
2. This bid division is responsible for new ANSUL systems for kitchen hood work.

32. Floyd Elementary

1. Refer to page D-M103 for mechanical demo and new work to be completed.
2. Coordinate with Bid Division 260000 for electrical for all equipment demo as well as new equipment.
3. Refer to all mechanical equipment schedules on page D-M001.
4. See notes on D-M103 for gas line and gas meter to be removed. Coordinate with Bid Division 075000 for sealing roof opening after running new refrigerant lines.
5. Refer to notes on D-M101 for new work to be completed.

33. Bullock Creek High School

1. Coordinate with asbestos contractor for demo to begin after their work is completed.
2. This bid division is responsible for new ANSUL systems for kitchen hood work.

Excludes:

1. Saw cutting and replacement of concrete for this bid division to be completed by general trades 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-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 222300

Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
ID for Plumbing Pipe and Eq	220553-1	ID for Plumbing - PD/chart/schedule	ID for Plumbing - product data and chart and schedule - see spec	Product Data
Plumbing Piping Insulation	220719-1	Plumbing Pipe Ins - PD	Plumbing Piping Insulation - product data	Product Data
Plumbing Piping	221005-1	Plumbing Piping - PD/SD	Plumbing Piping - product data and shop drawings - see spec	Product Data
Plumbing Piping Specialties	221006-1	Plumbing Piping Spec - PD SD	Plumbing Piping Specialties - Product data and shop drawings see	Product Data
Plumbing Fixtures	224000-1	Plumbing Fixt - PD	Plumbing Fixtures - product data	Product Data
Plumbing Fixtures	224000-2	Plumbing Fixt - samples	Plumbing Fixtures - samples - two sets of color chips for each tand	Samples
Duct Insulation	230713-1	Duct Insulation - PD	Duct Insulation - product data see spec	Product Data
Duct Insulation	230713-2	Duct Insulation - Samples	Duct Insulation - two samples of size for each insulation type	Samples
HVAC Piping Insulation	230719-1	HVAC Pipe Ins - PD	HVAC Piping Insulation - product data	Product Data
Building Management and C	230901-1	Control Sys - PD/SD	Control System - product data and shop drawings - see specs	Product Data
Hydronic Piping	232113-1	Hydronic Piping - PD	Hydronic Piping - Product data	Product Data
Hydronic Specialties	232114-1	Hydronic Spec - PD	Hydronic Specialties - product data and certs	Product Data
Hydronic Pumps	232123-1	Hydronic Pumps - PD	Hydronic Pumps - product data	Product Data
Refrigerant Piping	232300-1	Refrigerant Pipe - PD SD	Refrigerant Piping - product data and shop drawings see spec	Product Data
HVAC Water Treatment	232500-1	HVAC Water Trmt - PD SD	HVAC Water Treatment - product data and shop drawings see spe	Product Data
HVAC Ducts and Casings	233100-1	HVAC Ducts/Casings - shops	HVAC Ducts and Casings - shop drawings see spec	Shop Drawings
Air Duct Accessories	233300-1	Air Duct Acc - PD SD	Air Duct Accessories - product data and shop drawings see spec	Product Data
HVAC Power Ventilators	233423-1	HVAC Pwr Vent - PD	HVAC Power Ventilators - product data	Product Data
Air Outlets and Inlets	233700-1	Air Out/Inlets - PD	Air Outlets and Inlets - product data see spec	Product Data
Commercial Kitchen Hoods	233813-1	Kitchen Hoods - PD SD	Kitchen Hoods - product data and shop drawings see spec	Product Data
Condensing Boilers	235216-1	Boilers - PD/SD	Boilers - product data and shop drawings	Product Data
Air Cooled Refrigerant Cond	236313-1	Air Cooled Ref Cond - PD/SD	Air Cooled Refrigerant Condensers - product data and shop drawi	Product Data
Modular Central Station Air	237313-1	Cent Stat Air Hand Units - PD/SD	Modular Central Station Air Handling Units - product data and sho	Product Data
Packaged Outdoor Central S	237413-1	OutDr Cent Stat Air Units - PD/SD	Packaged Outdoor Central Station Air Handling Units - product da	Product Data
Packaged Outdoor Central A	237414-1	OutDr Cent Stat AHU RTU 3 - PD/SD	Packaged Outdoor Central Air Handling Units RTU-3 - product data	Product Data
Terminal Heat Transfer Unit	238101-1	Term Heat Trans Units - PD/SD	Terminal heat Transfer Units - product data and shop drawings - s	Product Data
Mechanical - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Mechanical - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Mechanical - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Mechanical - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Mechanical - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Mechanical - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Mechanical - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Mechanical - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Mechanical - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Mechanical - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Mechanical - Start Up	Start Up	11 Copy of permits	AHERA Notifications	Startup
Mechanical - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out

Mechanical - Close Out	220800-1	Comm for Plumb - testing	Commissioning of Plumbing - Testing see spec	Close Out
Mechanical - Close Out	221006-2	Plumbing Piping Spec - Extra material	Plumbing Piping Specialties - extra loose keys for hotside hoe bibb	Close Out
Mechanical - Close Out	224000-3	Plumbing Fixt - Warranty	Plumbing Fixtures -5 yr manufacturers warranty for electric water	Close Out
Mechanical - Close Out	230593-1	Testing Balancing - testing reports	Testing, Balancing - testing reports - see spec for the details	Close Out
Mechanical - Close Out	230713-3	Duct Insulation - maintenance	Duct Insulation - manufacturers instructions see spec	Close Out
Mechanical - Close Out	230800-1	Comm for HVAC - Testing	Commissioning of HVAC - testing reports	Close Out
Mechanical - Close Out	230901-2	Control Sys - Manual	Control System - O&M Manuals	Close Out
Mechanical - Close Out	230901-3	Control Sys - software	Control System - software	Close Out
Mechanical - Close Out	232113-2	Hydronic Piping - mntnc dta	Hydronic Piping - maintenance data - see spec	Close Out
Mechanical - Close Out	232113-3	Hydronic Piping - extra material	Hydronic Piping - provide two repacking kits for each size and valv	Close Out
Mechanical - Close Out	232114-2	Hydronic Spec - Man install inst	Hydronic Specialties - manufacturers installation instruction	Close Out
Mechanical - Close Out	232114-3	Hydronic Spec - Mtnc data	Hydronic Specialties - Maintenance data - see spec	Close Out
Mechanical - Close Out	232123-2	Hydronic Pumps - Extra material	Hydronic Pumps -extra pump seals - one set for each type and size	Close Out
Mechanical - Close Out	232500-2	HVAC Water Trmt - Mtnc	HVAC Water Treatment - maintenance material	Close Out
Mechanical - Close Out	232500-3	HVAC Water Trmt - owner training	HVAC Water Treatment - owner training	Close Out
Mechanical - Close Out	233423-2	HVAC Pwr Vent - extra material	HVAC Power Ventilators - extra fan belts one set for each individu	Close Out
Mechanical - Close Out	233813-2	Kitchen Hoods - Owner Training	Kitchen Hoods - owner training - see spec	Close Out
Mechanical - Close Out	235216-2	Boilers - Testing	Boilers - Testing	Close Out
Mechanical - Close Out	235216-3	Boilers - Manuals	Boilers - O&M Manuals see spec	Close Out
Mechanical - Close Out	235216-4	Boilers - Warranty	Boilers -standard warranty for fire tube condensing boilers	Close Out
Mechanical - Close Out	235216-5	Boilers - Owner Training	Boilers - Owner Training - see spec	Close Out
Mechanical - Close Out	237413-2	OutDr Cent Stat Air Units - Warranty	Packaged Outdoor Central Station Air Handling Units -warranty - 1	Close Out
Mechanical - Close Out	237413-3	OutDr Cent Stat Air Units - Manual	Packaged Outdoor Central Station Air Handling Units -O&M Manu	Close Out
Mechanical - Close Out	237414-2	OutDr Cent Stat AHU RTU 3 - Warranty	Packaged Outdoor Central Air Handling Units RTU-3 - Warranty - s	Close Out
Mechanical - Close Out	237414-3	OutDr Cent Stat AHU RTU 3 - Manuals	Packaged Outdoor Central Air Handling Units RTU-3 - O&M Manua	Close Out
Mechanical - Close Out	238101-2	Term Heat Trans Units - Extra materials	Terminal heat Transfer Units -extra filters one set of each type and	Close Out
Mechanical - Close Out	238101-3	Term Heat Trans Units - Warranty	Terminal heat Transfer Units - 5 yr manufacturers warranty for far	Close Out
Mechanical - Close Out	238101-4	Term Heat Trans Units - Manual	Terminal heat Transfer Units - O&M Manual	Close Out
Mechanical - Close Out	Close Out	12 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Mechanical - Close Out	Close Out	13 Consent of Surety	Consent of Surety	Closeout
Mechanical - Close Out	Close Out	14 Substantial Completion	Substantial Completion	Closeout
Mechanical - Close Out	Close Out	15 Hazardous Material Form	Hazardous Material Form	Closeout
Mechanical - Close Out	Close Out	16 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Mechanical - Close Out	Close Out	17 Extra Materials	Extra Materials Delivered to Owner	Closeout
Mechanical - Close Out	Close Out	18 All CO Signed/Returned	All CO Signed/Returned	Closeout
Mechanical - Close Out	Close Out	19 As Built Drawings	As Built Drawings with red lines	Closeout
Mechanical - Close Out	Close Out	20 Insurance up to date	Insurance up to date	Closeout
Mechanical - Close Out	Close Out	21 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout
Mechanical - Close Out	Close Out	22 Copy of Final Acceptance for Permits	Punch List Completed/Signed Off	Closeout

Bid Division: 260000 – Electrical

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 260800 – Electrical Commissioning and Testing Requirements
Section 262200 – Low Voltage Transformers
Section 260573 – Power System Studies
Section 262416 – Panelboards
Section 262726 – Wiring Devices
Section 262813 – Fuses
Section 262816.16 – Enclosed Switches
Section 265100 – Interior Lighting
Section 265600 – Exterior Lighting
Section 284600 – Fire Detection and Alarm

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

Section 033000 – Cast In Place Concrete (Provide concrete for cut and patch areas; light pole bases)
Section 078413 – Penetration Firestopping (As it relates to this Bid Division)
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:

All conduit, 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.)**

Bid Division: 260000 – Electrical

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Contractor shall maintain existing electrical systems in fully functional order in all areas of the building during the duration of the project.
2. Contractor shall coordinate with utility company for purchase and installation of exterior transformers and associated work, if required.
3. 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.
4. 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.
5. Contractor is responsible for disconnecting, removing and legal and proper off-site disposal of all indicated existing light fixtures including ballasts and bulbs. Ballasts shall be assumed to contain PCB's. Provide Owner with appropriate documentation of disposal.

Bid Division: 260000 – Electrical

6. Remove, clean and reinstall light fixtures where indicated.
7. Removal of electrical line power pole to old portable location.
8. Concrete Patching for mechanical and electrical trades by Bid Division 15000 and 16000.
9. Selective Demolition.
10. No concrete is to be installed until verification of acceptable density testing. 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.
11. Provide hook-up, final connection and interlocks for kitchen exhaust fan and kitchen make-up air units to hood controls.
12. Provide all permits required.
13. Supply and install exterior lights. (Including parking lot light bases.)
14. Remove spoils from site.
15. Provide all means necessary to provide temporary transformers to keep the school in operation before the final power turnover is complete.
16. Provide all cutting and patching required for existing tie-ins.
17. Maintain fire rating at all walls penetrated.
18. All excavation, backfill, compaction, and disposal of spoil for any electrical work placed below finish grade.
19. Coordinate with other trades for rough-in locations.
20. Provide temporary lighting and power distribution. A minimum of 100 watts of temporary lighting per 250 SF of floor area.
21. Provide all plywood or nailers required for mounting of electrical, audio, fire alarm or phone equipment.
22. Furnish any access hatches to mason and drywall contractors for installation required for electrical work.
23. Final hook-up of all equipment for other disciplines of work.
24. Patch all demolished areas affected by the electrical demolition to a condition ready to receive finish materials (finish materials by others, i.e. tile, carpet, etc.).
25. Perform all required demolition required for this trade as shown and specified.
26. Furnish and install all light and power fixtures in cabinetry.
27. Provide all final connection for kitchen equipment.
28. Supply and install a complete & operational fire protection alarm system.
29. Contractor is responsible for complete code compliance of Fire Alarm System.
30. Provide "As Built" Drawings for work.
31. Provide shop drawings to State Fire Marshal Plan Review or governing authority (allowing sufficient time for changes that may be made and must be completed prior to beneficial occupancy.)
32. Provide proper repair of all damaged ceilings, walls, floors, etc., when installing new fixtures.
33. Install pull box and chase conduit for temp control.
34. Provide Owner with training of new equipment.

Project Inclusions:

1. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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.

Bid Division: 260000 – Electrical

3. **This contractor will be responsible for providing coordination with the future commissioning agent and attending all of the required commissioning meetings. Refer to specifications section 260800 as included for reference. The commissioning work will be provided by a third-party company and will coordinate with this bid division to complete and verify all commissioning needs for this project.**
4. Contractor is responsible for disconnecting, removing, and legal and proper off-site disposal of all indicated existing light fixtures, including ballasts and bulbs.
5. Provide all required demolition of electrical items. Salvage as documented.
6. Remove and reinstall light fixtures where indicated.
7. Remove electrical power going out to the portable classroom as documented.
8. Include costs for all required permits in bid proposal.
9. Provide all required temporary power and lighting.
10. Provide final electrical connection for all equipment.
11. This contractor will be required to provide information pertaining to the energy incentive program of the utility company.
12. Provide all required Fire Marshall documentation regarding fire alarm testing, certifications, and 12A documents as required per NFPA.
13. This bid division is responsible for all disconnecting of power to make safe for demo by other bid divisions. Coordinate with bid division 222300 for all mechanical equipment to be disconnected before removal.
14. Coordinate with site work contractor for any location of private utilities as needed for site work.
15. Provide all low voltage wiring and connections.
16. Furnish and install all lighting control systems and provide Owner training of systems.
17. Furnish and install all conduits for cabling and data outlets as documented.
18. Furnish and install all required raceways and wire mold as documented.
19. Provide power and connection to door hold-opens and connect to fire alarm system.
20. Furnish and install all new fire alarm equipment as documented.
21. Remove and reinstall all existing fire alarm equipment as documented.
22. Bid Division 260000 will be responsible for furnishing and installing 120 v wiring and cabling for the access control systems.
23. This contractor shall provide daily clean-up of all debris generated by this contractor's daily work.
24. **Provide an allowance of $10,000 to be included in the base bid for any above-ceiling wiring to be brought up to code if required due to removal of ceiling systems.**

25. **Bullock Creek High School**
    a. Disconnect all fire alarm devices related to restroom renovations and replace with new ones by this bid division. Including smoke detectors, fire alarm strobes, and annunciators.
    b. Refer to Demo notes on page A-E101 for any fixtures to be removed and salvaged.
    c. Refer to lighting fixture schedule and specifications for all new lighting requirements.
    d. This bid division is responsible for tie-in of the new hood system to the fire alarm system.
    e. Coordinate with asbestos contractor to cut, cap, and make safe power to lights in areas to be abated.
26. **Floyd Elementary**
    a. Refer to page D-E103 for electrical demo in break room and relocation of electrical panels.
    b. Refer to lighting fixture schedule and specifications for all new lighting to be furnished and installed.
    c. Refer to page D-A104 for new light fixture locations on canopy reflecting ceiling plan. Coordinate with Bid Division 075000 for locations in soffit panels.

27. **Pine River Elementary**
    a. This bid division is responsible for tie-in of the new hood system to the fire alarm system.
    b. Refer to demolition notes on page E-E101 for electrical demo in kitchen areas.
    c. Refer to lighting fixture schedule and specifications for furnishing and install of all new lighting.
    d. Refer to site demolition note 4 for disconnect of power supply back to panel from portable.

Bid Division: 260000 – Electrical

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 260000

Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Low Voltage Electrical Powe	260519-1	Cond/Cables - PD	Low Voltage Electrical Power Conductors and Cables - product dat	Product Data
Grounding and Bonding for	260526-1	Ground/Bonding - PD	Grounding and Bonding - product data	Product Data
Hangers and Supports for El	260529-1	Hanger/Supports - PD	Hangers and Supports - product data	Product Data
Conduit for Electrical Systen	260533.13-1	Conduit - PD	Conduit - product data	Product Data
Boxes for Electrical Systems	260533.16-1	Boxes - PD	Boxes - product data - see spec	Product Data
Boxes for Electrical Systems	260533.16-2	Boxes - Samples	Boxes - samples of floor boxes - see spec	Samples
Identification for Electrical s	260553-1	ID - PD	Identification for Electrical systems - product data	Product Data
Low Voltage Transformers	262413-1	Low Volt Trans - PD SD	Low Voltage Transformers - product data and shop drawings	Product Data
Panelboards	262416-1	Panelboards - PD SD	Panelboards - product data and shop drawings see spec	Product Data
Wiring Devices	262726-1	Wiring Devices - PD	Wiring Devices product data see spec	Product Data
Fuses	262813-1	Fuses - PD	Fuses - product data see spec	Product Data
Enclosed Switches	262816.16-1	Enclosed Switches - PD	Enclosed Switches - product data see spec	Product Data
Interior Lighting	265100-1	Interior Lighting - PD	Interior Lighting - product data - see spec	Product Data
Exterior Lighting	265600-1	Exterior Lighting - PD	Exterior Lighting - product data see spec	Product Data
Fire Detection and Alarm	284600-1	Fire Ded/Alarm - PD SD	Fire Detection and Alarm - product data and shop drawings - see s	Product Data
Electrical - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Electrical - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Electrical - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Electrical - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Electrical - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Electrical - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Electrical - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Electrical - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Electrical - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Electrical - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Electrical - Start Up	Start Up	11 Copy of Permits	AHERA Notifications	Startup
Electrical - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Electrical - Close Out	260533.16-3	Boxes - extra materials	Boxes - furnish keys for lockable enclosures two of each different	Close Out
Electrical - Close Out	260800-1	Comm/Test - reports	Commissioning and Testing - Test Reports - see spec	Close Out
Electrical - Close Out	260800-2	Comm/Test - Manuals	Commissioning and Testing - O&M Manuals	Close Out
Electrical - Close Out	262416-2	Panelboards - Extra Material	Panelboards - Extra keys - 2 for each different key	Close Out
Electrical - Close Out	265100-2	Interior Lighting - Warranty	Interior Lighting - Warranties - see spec	Close Out
Electrical - Close Out	284600-2	Fire Ded/Alarm - Warranty	Fire Detection and Alarm - Warranty - see spec	Close Out
Electrical - Close Out	284600-3	Fire Ded/Alarm - manual	Fire Detection and Alarm - O&M Manuals - see spec	Close Out
Electrical - Close Out	Close Out	12 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Electrical - Close Out	Close Out	13 Consent of Surety	Consent of Surety	Closeout
Electrical - Close Out	Close Out	14 Substantial Completion	Substantial Completion	Closeout
Electrical - Close Out	Close Out	15 Hazardous Material Form	Hazardous Material Form	Closeout

Electrical - Close Out	Close Out	16 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Electrical - Close Out	Close Out	17 Extra Materials	Extra Materials Delivered to Owner	Closeout
Electrical - Close Out	Close Out	18 All CO Signed/Returned	All CO Signed/Returned	Closeout
Electrical - Close Out	Close Out	19 As Built Drawings	As Built Drawings with red lines	Closeout
Electrical - Close Out	Close Out	20 Insurance up to date	Insurance up to date	Closeout
Electrical - Close Out	Close Out	21 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout
Electrical - Close Out	Close Out	22 Copy of Final Acceptance for Permits	Punch List Completed/Signed Off	Closeout

Bid Division: 310000 – Site Work (Pine River Elementary)

Bid to Include:

Total Responsibility for Specification Sections:

Section 024100 -- Demolition
Section 024113.13 – Pavement Removal
Section 31231 – Excavating, Filling and Grading
Section 312500 – Soil Erosion and Sedimentation Control
Section 313700 – Rip Rap
Section 321124 – Aggregate Base
Section 321216 – Asphalt Paving
Section 329218 – Lawn Restoration
Section 333100 – Sanitary Sewer
Section 334401 – Storm Sewers

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

Section 078413 – Penetration Firestopping
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.

Bid Division: 310000 – Site Work

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 makes 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 15 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 the 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. Contractors 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 SHEETS tool. However, it is each contractor's responsibility to verify that they are working from the most up-to-date, approved, drawings.**
20. **Mandatory response to ALL Bulletins issued within time frame given, to include "no cost change".**
21. **Mandatory attendance at all required pre-construction meetings.**
22. 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.
23. **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.**

Division Inclusions:

1. Removal of excess spoils 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, flagpole, 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. INCLUDE HERE IF THERE IS NO BID DIVISION 329000.

Bid Division: 310000 – Site Work

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.
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. Project Inclusions are provided as assistance for contractors that are bidding and are not an all-inclusive scope of work. It is every contractor's responsibility to review all the construction documents and prepare their bid accordingly.
2. 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, this contractor shall include any overtime or premium rates in their bid proposal as necessary. 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 milestone schedule will need to be achieved.
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 are to be removed by this Bid Division. Saw cutting by Bid Division 030100.
6. Provide all stripping of site materials as required for the installation of new work.

Bid Division: 310000 – Site Work

7. Provide and install silt fence around topsoil stockpile as indicated in drawings and specifications.
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.
11. Provide all required water, storm sewer and sanitary sewer work 5' outside the building wall line unless noted otherwise.
12. Provide sand base for walks and building pad as documented.
13. Furnish and install all storm and sanitary piping.
14. Provide all required topsoil and fine grading as necessary for the installation of hydroseeding.
15. Patching existing asphalt drive disturbed during construction if caused by this Bid Division.
16. 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.
17. The Electrical contractor will provide the location of any privately owned underground site utilities that are traceable. Coordinate with the Electrical contractor for location of these private utilities.
18. Provide clean-up as necessary of the parking lots and private roadways from construction activities.
19. This contractor shall be responsible for replacing any damaged concrete or asphalt paving if damage was created by this contractor.
20. Coordinate with bid division 030100 for saw cutting of exterior concrete and asphalt prior to removal by this bid division.
21. Refer to all notes on page E-C101 to be the responsibility of this contractor. Coordinate with Bid Division 260000 for power disconnect.
22. Refer to construction notes 1, 2, 5, and 6 on page E-C102 to be the responsibility of this bid division.
23. Refer to site grading and utilities plan on page E-C103 for work by this bid division.
24. Refer to page E-C104 for soil erosion and sedimentation control plan for work by this bid division.

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-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 310000

Firestopping	078400-1	Firestopping - PD	Firestopping - product data and schedule	Product Data
Joint Sealers	079005-1	Joint Sealers - PD	Joint Sealers - product data	Product Data
Joint Sealers	079005-2	Joint Sealers - Samples	Joint Sealers - Samples of colors - see spec	Samples
Asphalt Paving	321216-1	Asphalt Paving - PD/Mix	Asphalt Paving - product data and mix design - see spec	Product Data
Sanitary Sewer	333100-1	Sanitary Sewer - PD	Sanitary Sewer - product data see spec	Product Data
Storm Sewers	334401-1	Storm Sewers - PD	Storm Sewers - product data for pipe and pipe accessories	Product Data
Site Work - Start Up	Start Up	01 Post Bid Interview/Proposal Forms	Post Bid Interview/Proposal Forms Signed and Completed	Startup
Site Work - Start Up	Start Up	02 Schedule of Values	Schedule of Values	Startup
Site Work - Start Up	Start Up	03 Contracts Signed/Returned	Contracts Signed/Returned	Startup
Site Work - Start Up	Start Up	04 Payment/Performance Bonds	Payment/Performance Bonds	Startup
Site Work - Start Up	Start Up	05 Insurance w/binders	Insurance w/binders	Startup
Site Work - Start Up	Start Up	06 Contact/Employee List	Contact/Employee List	Startup
Site Work - Start Up	Start Up	07 Safety Policy	Safety Policy	Startup
Site Work - Start Up	Start Up	08 Safety Data Sheets (SDS)	Safety Data Sheets (SDS)	Startup
Site Work - Start Up	Start Up	09 Sub/Supplier Form	Sub/Supplier Form	Startup
Site Work - Start Up	Start Up	10 AHERA Notifications	AHERA Notifications	Startup
Site Work - Close Out	079005-3	Joint Sealers - Warranty	Joint Sealers - 2 yr manufacturers warranty - see spec	Close Out
Site Work - Close Out	Close Out	11 Contractor (2) Yr Guarantee	Contractor (2) Yr Guarantee	Closeout
Site Work - Close Out	Close Out	12 Consent of Surety	Consent of Surety	Closeout
Site Work - Close Out	Close Out	13 Substantial Completion	Substantial Completion	Closeout
Site Work - Close Out	Close Out	14 Hazardous Material Form	Hazardous Material Form	Closeout
Site Work - Close Out	Close Out	15 Asbestos Materials Affidavits	Asbestos Materials Affidavits	Closeout
Site Work - Close Out	Close Out	16 Extra Materials	Extra Materials Delivered to Owner	Closeout
Site Work - Close Out	Close Out	17 All CO Signed/Returned	All CO Signed/Returned	Closeout
Site Work - Close Out	Close Out	18 As Built Drawings	As Built Drawings with red lines	Closeout
Site Work - Close Out	Close Out	18 Insurance up to date	Insurance up to date	Closeout
Site Work - Close Out	Close Out	20 Punch List Completed/Signed Off	Punch List Completed/Signed Off	Closeout

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.** 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.

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
Jason McDonald jmcdonald@wolgast.com or **Lisa Donahue** ldonahue@wolgast.com
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: **Bullock Creek School District**

Site Location: **Middle School**

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

CLARIFICATION REQUEST FORM

Date: _____

Wolgast Clarification Request #:_____

To: Wolgast Corporation
Jason McDonald jmcdonald@wolgast.com or **Lisa Donahue** ldonahue@wolgast.com
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: **Bullock Creek School District**

Site Location: **High School Pine River Elem Floyd Elem – Circle what building your are referencing**

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

1.01OWNER/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

AIA® 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)

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.

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) 790-9120

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.

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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

§ 2.1 Provide all work described by but not limited to Bidding Requirements, Contract Forms and Conditions of the Contract, Additional Conditions of the Contract, General Conditions of the Contract for Construction, Division 1 General Requirements and:

BID DIVISION: «Bid_Division» - «Description»

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 satisfactory completion of the work of this bid division (as indicated on drawings and associated specifications.) Including but not limited to:

«Written_Description»

INCLUDING SECTIONS: «Including_Sections1»

Limited Responsibility**:** «Limited_Responsibility»

§ 2.2 Pre-Bid Meeting Agenda and Meeting Minutes dated: «Pre_Bid_Date»
§ 2.3 Post-Bid Interview dated: «Post_Bid_Interview_Date»
§ 2.4 Pre-Construction Meeting Agenda and Meeting Minutes dated: «Pre_Con_Date»
§ 2.5 Performance Bond and Labor and Material Payment Bond required: «Bond_Required»
§ 2.6 Project Start Date: «Project_Start_Date»
§ 2.7 Completion Date: «Completion_Date»

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§ 2.8 All submittals and shop drawings required by the specifications must be submitted by: «Submittals_Due_By»

§ 2.9 Provide all clean-up and legal off-site disposal of all debris generated by any work performed by this Contract including general housekeeping of employee generated trash and garbage (i.e. drink cups, food wrappers, bag, etc.).

§ 2.10 The Bid Division Description(s) identify the scope of work, areas of responsibility and specific work to be included in the Contract Amount. If any conflict is found between the architect/engineer specifications and the Bid Division Descriptions regarding the scope of work to be performed, the Bid Division Description(s) shall govern. Further, if a conflict occurs between the Bidding Requirements, the General Requirements, the Specifications, the Bid Division Description(s), the Drawings, or the Addenda(s), the most stringent requirement shall apply.

§ 2.11 Other Special provisions: Article 8.6

§ 2.12 Compliance with EPA AHERA for Asbestos: The Contractor must adhere to all EPA AHERA and Michigan State Asbestos Regulations for Asbestos and other hazardous materials.

§ 2.13 Compliance with Lead-Containing Materials: ALL Contractors, Subcontractors and Sub-Subcontractors shall adhere to the Environmental Protection Agency (EPA) lead-based paint regulation titled the "Renovation, Repair and Paint (RRP) Rule". Included under this law are "Child Occupied Facilities" (COFs). COFs encompass locations of pre-1978 constructed buildings where children under age six (6) regularly visit, such as kindergarten rooms, 1st grade classrooms, applicable restrooms, pre-school and day care centers. Therefore portions of each pre-1978 constructed school building falls under the RRP Rule. 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 included 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. Furthermore, all Contractors shall be responsible to comply with all applicable Federal and Michigan State lead regulations including, but not limited to, 29CFR Part 1926.62 of the OSHA Lead Construction Standards, (Part 603 of the Michigan State Standards). All costs associated with regulatory compliance shall be borne by the Contractor.

§ 2.14 This Contractor is responsible for all safety issues for all work that he has effected until his project is complete.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

[X] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be : See Milestone Schedule for details
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

«Substantial_Completion_Date»

§ 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

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§ 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:

☐ Cost of the work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below:

☐ Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 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.

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
«Alternate_Description»	

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a 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)

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:

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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 CM 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 approved schedule of values, unless objected to by the Construction Manager, shall be used as a basis for reviewing the Contractor's Invoicing Form and CM 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, 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 Take 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 That portion of Construction Change Directives that the Architect determines, 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 Architect 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 as provided in Article 9 of AIA Document A232-2019.

.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, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232-2019; and

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.5 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.

§ 5.2 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, 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 the issuance of the final Certificate for Payment o Project Certificate for Payment, or as follows:

§ 5.2.2 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 for 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.

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§ 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, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(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, 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 In an effort to resolve any conflicts that arise during the construction of the Project or following the completion of the project, 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

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

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

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 amended or supplemented therein, or as amended or supplemented by other provisions of the Contract Documents.

§ 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 Article 11 of AIA Document A132™-2019, and elsewhere in the Contract.

§ 8.6 Other provisions:

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

§ 8.6.2 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.

§ 8.6.3 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.

§ 8.6.4 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.

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§ 8.6.5 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.

§ 8.6.6 All Contractors must conform to the provisions of the Michigan Right-To-Know Law, 1986 PA 80.

§ 8.6.7 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.

§ 8.6.8 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.

§ 8.6.9 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.

§ 8.6.10 Claims 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 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.

§ 8.6.11 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.

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

§ 8.6.13 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

.2

.3 AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4

.5 The Drawings are as follows, and are dated «Drawings Dates» unless a different date is show 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
«Addendum 1»	«Adm Date»	

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«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. AIA Document A232-2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

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

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

OWNER	CONTRACTOR
«Owner_Name»	«Contractor»
_____	_____
(Signature)	(Signature)
«Owner_and_Title»	_____
(Printed name and title)	(Printed name and title)
_____	_____
(Date)	(Date)

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PART 1 – GENERAL

1.01BID 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 oblige.

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.**

1.02LABOR & 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 MICHGIAN.**

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.

1.03SUPPLY 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.**

1.04BOND 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).

1.05SUBMISSION 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: **Bullock Creek School District**
1420 S Badour Road
Midland, MI 48640

D. Certificates must show as 'additional insured' the Owner, **Bullock Creek School District,** the Architect, **THA Architects/Engineers,** 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:

Bullock Creek School District

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:

Bullock Creek School District

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: _____

ACORD®

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	CONTACT NAME:	
(2)	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : (4)	
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED (3)

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

CERTIFICATE HOLDER	CANCELLATION
(11) INSERT THE OWNER'S NAME HERE NOTE: PLEASE HAVE YOUR INSURANCE COMPANY MAIL THIS DOCUMENT TO THE CONTRUCTION MANAGER	(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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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.

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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:

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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.

POLICY NUMBER: COMMERCIAL GENERAL LIABILITY

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.

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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 the 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 it 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 included in the Work shall be listed. Each item 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 awarding a contract, the Construction Manager will notify the contractor if the Owner has a 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 employee 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 a 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® – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)

Bullock Creek School District, 2024 School Bond Construction Program – including erecting, furnishing and equipping additions to school buildings; remodeling, furnishing and refurnishing and equipping and reequipping school buildings; acquiring, installing, equipping and reequipping school buildings for instructional technology; purchasing school buses; erecting and equipping structures; and acquiring, preparing, developing, improving and equipping playgrounds, athletic fields 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.

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.

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)

Bullock Creek School District
1420 Badour Road
Midland, Michigan 48640
Telephone: (989) 631-9022
Facsimile: (989) 631-2882

THE ARCHITECT:
(Name, legal status, and address)

THA Architects Engineers
817 East Kearsley Street
Flint, Michigan 48503
Telephone: (810) 767-5600
Facsimile: (810) 767-1650

Init.
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TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT AND CONSTRUCTION MANAGER

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

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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,~~ 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.

§ 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

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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 ~~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 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.

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§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

§ 1.5.1 ~~The~~ 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 ~~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~~

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~~sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or ~~authorization.~~ 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 Evidence of the Owner's Financial Arrangements

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

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

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

§ 2.2.4 Where the ~~Owner has designated information furnished under this Section 2.2 as~~ 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~~ 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.

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§ 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.

§ 2.4 Owner's Right to Stop the Work

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

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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

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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.~~ 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.

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§ 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 ~~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'

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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 ~~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.

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§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are ~~more than or~~ less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 Superintendent

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

§ 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. 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.~~ submittals, and (3) provide for expeditious and practical execution of the Work. If the Contractor fails to submit a submittal schedule, or fails to

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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 ~~general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.~~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

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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

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~~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.

§ 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.

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§ 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 ~~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 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 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

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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, Construction Manager, Architect, and Contractor.~~ 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.~~ 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. However,~~ 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.

§ 4.2.3 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.

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§ 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. 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. 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.

§ 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.

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§ 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 ~~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.

§ 4.2.16 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 ~~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.

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§ 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.

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~~ 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.

§ 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

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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 ~~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.~~

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 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.

§ 6.1.2 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.

~~**§ 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 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

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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. ~~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.

§ 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 ~~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.

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~~ 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.

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§ 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~~ 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.

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§ 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. ~~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.

§ 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.

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§ 8.3 Delays and Extensions of Time

§ 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, 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; 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.

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

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

§ 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.~~ adjusted, unless the Contractor provided such unit prices as a part of a competitive bid.

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§ 9.2 Schedule of Values

~~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 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.

§ 9.3.1.2 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 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.

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.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.

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§ 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.~~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.

§ 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;~~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; ~~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.

§ 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

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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 ~~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.

§ 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.

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§ 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,~~ 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 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 ~~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.

§ 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

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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, 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.~~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

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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.

§ 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 ~~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.

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.

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§ 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~~ 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.

§ 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 ~~either party~~ the Contractor suffers injury or damage to person or property because of an act or omission of ~~the other party,~~ theOwner, 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

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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.

§ 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~~ 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~~

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~~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.

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

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

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's 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 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

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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.

§ 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. ~~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

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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.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner ~~and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the 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.~~

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the ~~insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the 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~~

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the 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.

§ 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. ~~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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§ 12.2.2.2 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 ~~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).

§ 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.

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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 ~~unreasonable~~ delay in the Work.

§ 13.5 Interest

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

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§ 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, ~~for~~ 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 ~~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

.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 ~~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.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper ~~materials;~~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 ~~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

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.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;

.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

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.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by ~~either~~ the ~~Owner or~~ Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by 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.

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§ 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 ~~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 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.~~ 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.

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

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor ~~and Owner waive Claims against each other~~ 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.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial ~~decision.~~ 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.

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§ 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: (I) 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 (I0) 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~~ 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 I3.1 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 I3.1 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.~~

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§ 15.3 Mediation

§ 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.~~

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

~~**§ 15.4 Arbitration**~~

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

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

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

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

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 ~~Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration~~ 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

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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 subject to the prevailing wage rates and fringe benefit requirements of the Michigan Prevailing Wage Act, MCL 401.1101, et seq. The Contractor shall comply with, and ensure that its subcontractors comply with, the Michigan Prevailing Wage Act. The Contractor shall indemnify and hold the Owner harmless from any claim, damage, loss, or expense incurred by the Owner, including but not limited to actual attorneys' fees, in any way related to failure of Contractor or its subcontractors to comply with the Michigan Prevailing Wage Act.

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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' RESPONSIBILITES***

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

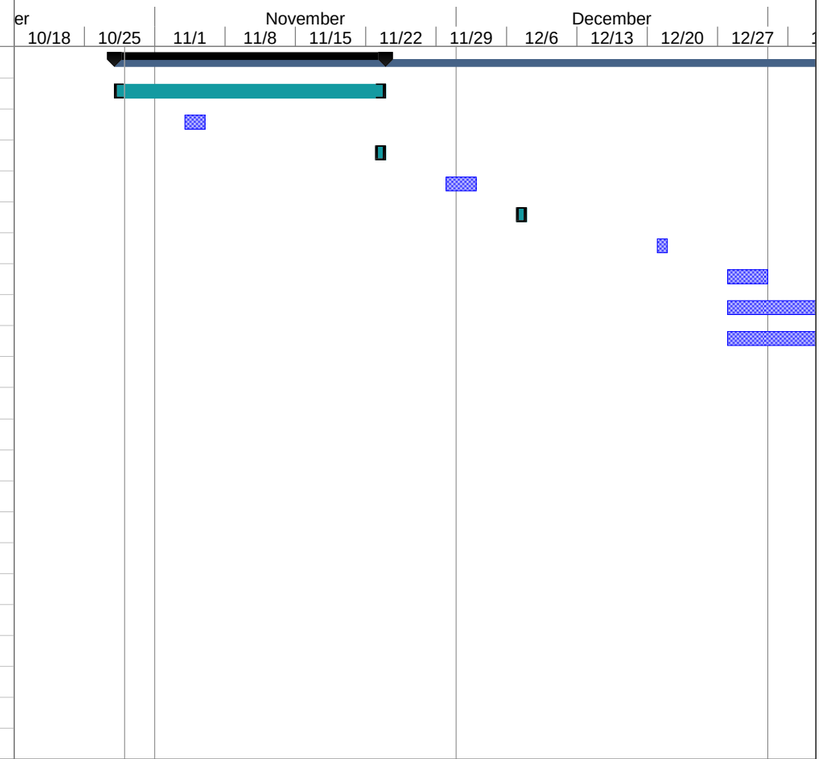
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END OF SECTION 00999

Bullock Creek School District
Series II Renovation Project
Milestone Schedule 2027

Wolgast CORPORATION

ID	Task Name	Duration	Start	Finish	Pred	RN	Text1
1	**Bidding**	**19 days**	**Wed 10/28/26**	**Mon 11/23/26**			
2	Bid Period	19 days	Wed 10/28/26	Mon 11/23/26			
3	Pre-Bid Walkthrough	2 days	Wed 11/4/26	Thu 11/5/26			
4	Bid Due Date	1 day	Mon 11/23/26	Mon 11/23/26			
5	Post Bid Interviews	3 days	Mon 11/30/26	Wed 12/2/26			
6	Award Recommendation	1 day	Mon 12/7/26	Mon 12/7/26			
7	Owner Approval of Contracts	1 day	Mon 12/21/26	Mon 12/21/26			
8	Prepare and Issue Contracts	4 days	Mon 12/28/26	Thu 12/31/26			
9	Submittal Process	20 days	Mon 12/28/26	Fri 1/22/27			
10	Material Ordered	20 days	Mon 12/28/26	Fri 1/22/27			
11	Pre-Construction Meeting (Tentative)	1 day	Fri 4/2/27	Fri 4/2/27			
12	**Middle School Renovations**	**50 days**	**Mon 6/7/27**	**Fri 8/13/27**			
13	Asbestos removal	15 days	Mon 5/3/27	Fri 5/21/27			
14	Mobilize	1 day	Mon 5/24/27	Mon 5/24/27			
15	Demolition	10 days	Tue 5/25/27	Mon 6/7/27	14		
16	MEP Demolition	7 days	Tue 6/8/27	Wed 6/16/27	15		
17	MEP New Work	15 days	Thu 6/17/27	Wed 7/7/27	16		
18	Finishes	10 days	Tue 7/20/27	Mon 8/2/27			
20	Final Inspections	3 days	Mon 8/9/27	Wed 8/11/27			
21	Final Cleaning	2 days	Thu 8/12/27	Fri 8/13/27	20		
22	Punch List by Architect/Owner	1 day	Mon 8/16/27	Mon 8/16/27			
23	Punch List Work by All Contractors	4 days	Tue 8/17/27	Fri 8/20/27	22		
24	Turnover to Owner	1 day	Fri 8/20/27	Fri 8/20/27	21		

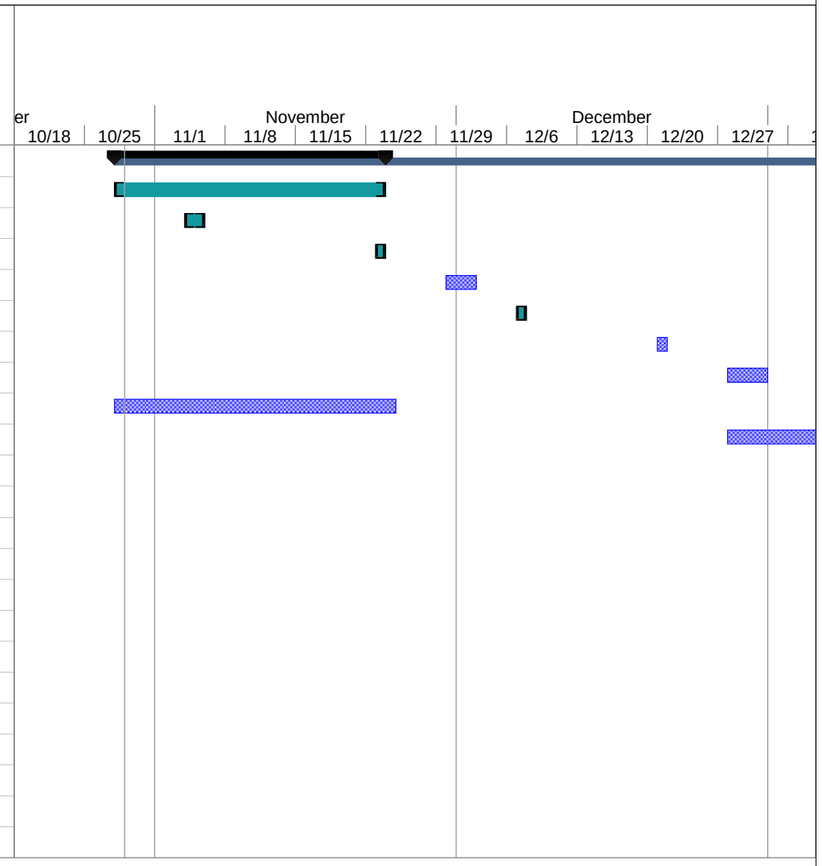


Wolgast Corporation reserves the right to make changes to this construction schedule as the project progress warrants.

Bullock Creek School District
Series II Renovation Projects
Milestone Schedule 2027

Thu 10/29/26

ID	Task Name	Duration	Start	Finish	Pred	RN	Text1
1	**Bidding**	**19 days**	**Wed 10/28/26**	**Mon 11/23/26**			
2	Bid Period	19 days	Wed 10/28/26	Mon 11/23/26			
3	Pre-Bid Meeting	2 days	Wed 11/4/26	Thu 11/5/26			
4	Bid Due Date	1 day	Mon 11/23/26	Mon 11/23/26			
5	Post Bid Interviews	3 days	Mon 11/30/26	Wed 12/2/26			
6	Award Recommendation	1 day	Mon 12/7/26	Mon 12/7/26			
7	Owner Approval of Contracts	1 day	Mon 12/21/26	Mon 12/21/26			
8	Prepare and Issue Contracts	4 days	Mon 12/28/26	Thu 12/31/26			
9	Submittal Process	20 days	Wed 10/28/26	Tue 11/24/26			
10	Material Ordered	20 days	Mon 12/28/26	Fri 1/22/27			
11	Pre-Construction Meeting (Tentative)	2 days	Thu 4/1/27	Fri 4/2/27			
12	**HS / Pine River / Floyd Additions/Renovations**	**50 days**	**Mon 6/7/27**	**Fri 8/13/27**			
13	Mobilize	2 days	Mon 6/7/27	Tue 6/8/27			
14	Asbestos Removal as needed	5 days	Wed 6/9/27	Tue 6/15/27	13		
15	Interior Demolition	5 days	Wed 6/16/27	Tue 6/22/27	14		
16	MEP Demo	5 days	Wed 6/23/27	Tue 6/29/27	15		
17	MEP new work	15 days	Wed 6/30/27	Tue 7/20/27	16		
18	Finishes	13 days	Wed 7/21/27	Fri 8/6/27	17		
19	Final Inspections	3 days	Mon 8/9/27	Wed 8/11/27	18		
20	Final Cleaning	2 days	Thu 8/12/27	Fri 8/13/27			
21	Punch List by Architect/Owner	1 day	Mon 8/16/27	Mon 8/16/27	20		
22	Punch List Work by All Contractors	4 days	Tue 8/17/27	Fri 8/20/27	21		
23	Turnover to Owner	1 day	Mon 8/23/27	Mon 8/23/27	22		



Wolgast Corporation reserves the right to make changes to this construction schedule as the project progress warrants.

PART 1 – GENERAL

1.01 PROJECT DESCRIPTION

A. Bullock Creek School District – 2024 Bond Series 2 - 2027 Improvements

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 the 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 **Refer to Milestone Schedule.** 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. 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 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 based on 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 an 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 Complied Laws.

_____
Deponent Signature

_____
Deponent Name – Typewritten

_____County, Michigan
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 Complied Laws.

Page 2 – Sworn Statement Sample

Project Name: Site Location:

SUB/SUPPLIER	DESCRIPTION	TOTAL CONTRACT	AMOUNT PAID	AMOUNT OWING	RETENTION HELD	BALANCE TO COMPLETE

PARTIAL UNCONDITIONAL WAIVER OF LIEN
Subcontractor/Supplier

Check No. _____

Amount: $ _____

Invoice#: _____

I/we have a contract with **Bullock Creek School District – 2024 Bond Series 2 - 2027 Improvements** to provide

_____For the improvement of the property described as **Bullock Creek School District,** and hereby waive my/our construction lien to the amount of $_____ for labor/materials provided through _____.

This waiver, together will 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 **Bullock Creek School District – 2024 Bond Series 2 - 2027 Improvements** to provide _____For the improvement of the property described as **Bullock Creek School District,** 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, sitpulating 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 the 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 ☐ increased / ☐ 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

PART 1 – GENERAL

1.01 PREVAILING WAGE

A. This project shall be subject to the prevailing wage laws of the State of Michigan.

B. The Owner has requested the prevailing wage rates applicable for this project and project location. The applicable prevailing wage rates provided by the Owner are enclosed on the following pages.

C. The Owner and Construction Manager expressly rely upon the contractor to satisfy the pay requirements of the prevailing wage laws of the State of Michigan.

D. Each proposal shall include the Prevailing Wage for **Midland** County as of the latest published issue by the State of Michigan.

END OF SECTION 01060

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
1.1 Laborer Common	**10/28/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$41.46	$55.30	$69.14
Apprentice: Level 1 0-1000 hours	$34.54	$44.92	$55.30
Apprentice: Level 2 1001-2000 Hours	$35.92	$46.99	$58.06
Apprentice: Level 3 2001-3000 hours	$36.98	$48.75	$60.51
Apprentice: Level 4 3001-4000 hours	$40.08	$49.43	$61.32

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
3.1 Power Equip. Operator - Highway & Heavy	**11/01/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$71.46	$94.57	$117.67
Apprentice: Level 1 0 - 6 Months	$57.61	$73.79	$89.97
Apprentice: Level 2 7 -12 Months	$59.93	$77.28	$94.61
Apprentice: Level 3 13 - 18 Months	$62.23	$80.73	$99.21
Apprentice: Level 4 19 - 24 Months	$64.54	$84.19	$103.83
Apprentice: Level 5 25 - 30 Months	$66.85	$87.66	$108.45
Apprentice: Level 6 31 - 36 Months	$69.15	$91.10	$113.05

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
3.2 Power Equip. Operator - Highway & Heavy			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$70.31	$92.84	$115.37
Apprentice: Level 1 0 - 6 Months	$56.81	$72.59	$88.37
Apprentice: Level 2 7 -12 Months	$59.06	$75.97	$92.87
Apprentice: Level 3 13 - 18 Months	$61.31	$79.35	$97.37
Apprentice: Level 4 19 - 24 Months	$63.56	$82.72	$101.87
Apprentice: Level 5 25 - 30 Months	$65.81	$86.09	$106.37
Apprentice: Level 6 31 - 36 Months	$68.06	$89.47	$110.87

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
3.3 Power Equip. Operator - Highway & Heavy			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.58	$82.75	$101.91
Apprentice: Level 1 0 - 6 Months	$52.10	$65.53	$78.95
Apprentice: Level 2 7 -12 Months	$54.02	$68.41	$82.79
Apprentice: Level 3 13 - 18 Months	$55.92	$71.26	$86.59
Apprentice: Level 4 19 - 24 Months	$57.84	$74.14	$90.43
Apprentice: Level 5 25 - 30 Months	$59.75	$77.00	$94.25
Apprentice: Level 6 31 - 36 Months	$61.67	$79.89	$98.09

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
3.4 Power Equip. Operator - Highway & Heavy			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.02	$81.91	$100.79
Apprentice: Level 1 0 - 6 Months	$51.70	$64.93	$78.15
Apprentice: Level 2 7 -12 Months	$53.59	$67.76	$81.93
Apprentice: Level 3 13 - 18 Months	$55.48	$70.60	$85.71
Apprentice: Level 4	$57.36	$73.42	$89.47
Apprentice: Level 5 25 - 30 Months	$59.25	$76.25	$93.25
Apprentice: Level 6 31 - 36 Months	$61.13	$79.07	$97.01

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
3.5 Power Equip. Operator - Highway & Heavy			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$44.80	$60.98	$77.15
Apprentice: Level 1 0 - 6 Months	$35.09	$46.42	$57.73
Apprentice: Level 2 7 -12 Months	$36.71	$48.84	$60.97
Apprentice: Level 3 13 - 18 Months	$38.33	$51.27	$64.21
Apprentice: Level 4 19 - 24 Months	$39.95	$53.71	$67.45
Apprentice: Level 5 25 - 30 Months	$41.57	$56.13	$70.69
Apprentice: Level 6 31 - 36 Months	$43.18	$58.55	$73.91

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
4.1 Power Equip. Operator - Commercial	**10/31/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$71.22	$94.21	$117.19
Apprentice: Level 1 0 - 6 Months	$57.43	$73.52	$89.61
Apprentice: Level 2 7 - 12 Months	$59.73	$76.97	$94.21
Apprentice: Level 3 13 - 18 Months	$62.03	$80.42	$98.81
Apprentice: Level 4 19 - 24 Months	$64.32	$83.86	$103.39
Apprentice: Level 5 25 - 30 Months	$66.62	$87.31	$107.99
Apprentice: Level 6 31 - 36 Months	$68.92	$90.76	$112.59

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.2 Power Equip. Operator - Commercial			**10/31/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$70.93	$93.77	$116.61
Apprentice: Level 1 0 - 6 Months	$57.22	$73.21	$89.19
Apprentice: Level 2 7 - 12 Months	$59.51	$76.65	$93.77
Apprentice: Level 3 13 - 18 Months	$61.80	$71.52	$89.80
Apprentice: Level 4 19 - 24 Months	$64.07	$83.48	$102.89
Apprentice: Level 5 25 - 30 Months	$66.36	$86.92	$107.47
Apprentice: Level 6 31 - 36 Months	$68.64	$90.33	$112.03

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.3 Power Equip. Operator - Commercial			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$70.11	$92.55	$114.97
Apprentice: Level 1 0 - 6 Months	$56.66	$72.37	$88.07
Apprentice: Level 2 7 - 12 Months	$58.90	$75.73	$92.55
Apprentice: Level 3 13 - 18 Months	$61.14	$79.09	$97.03
Apprentice: Level 4 19 - 24 Months	$63.38	$82.45	$101.51
Apprentice: Level 5 25 -30 Months	$65.63	$85.82	$106.01
Apprentice: Level 6 31 - 36 Months	$67.87	$89.18	$110.49

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.4 Power Equip. Operator - Commercial			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$69.25	$91.25	$113.25
Apprentice: Level 1 0 - 6 Months	$56.05	$71.45	$86.85
Apprentice: Level 2 7 - 12 Months	$58.25	$74.75	$91.25
Apprentice: Level 3 13 -18 Months	$60.45	$78.06	$95.65
Apprentice: Level 4 19 - 24 Months	$62.65	$81.35	$100.05
Apprentice: Level 5 25 - 30 Months	$64.85	$84.66	$104.45
Apprentice: Level 6 31 -36 Months	$67.05	$87.96	$108.85

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.5 Power Equip. Operator - Commercial			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$68.28	$89.80	$111.31
Apprentice: Level 1 0 - 6 Months	$55.37	$70.44	$85.49
Apprentice: Level 2 7 -12 Months	$57.53	$73.68	$89.81
Apprentice: Level 3 13 - 18 Months	$61.83	$80.12	$98.41
Apprentice: Level 5 25 - 30 Months	$63.98	$83.35	$102.71
Apprentice: Level 6 31 - 36 Months	$66.13	$86.58	$107.01

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.6 Power Equip. Operator - Commercial			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$66.57	$87.24	$107.89
Apprentice: Level 1 0 - 6 Months	$54.17	$68.64	$83.09
Apprentice: Level 2 7 -12 Months	$56.24	$71.74	$87.23
Apprentice: Level 3 13 - 18 Months	$58.30	$74.82	$91.35
Apprentice: Level 4 19 -24 Months	$60.37	$77.93	$95.49
Apprentice: Level 5 25 - 30 Months	$62.44	$81.04	$99.63
Apprentice: Level 6 31 - 36 Months	$64.50	$84.13	$103.75

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
4.7 Power Equip. Operator - Commercial			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$59.26	$67.72	$84.72
Apprentice: Level	$54.15	$68.61	$83.05
Apprentice: Level 1 0 - 6 Months	$49.05	$60.95	$72.85
Apprentice: Level 2 7 -12 Months	$50.76	$63.52	$76.27
Apprentice: Level 3 13 - 18 Months	$52.46	$66.07	$79.67
Apprentice: Level 5 25 - 30 Months	$55.85	$71.16	$86.45
Apprentice: Level 6 31 - 36 Months	$57.55	$73.71	$89.85

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
4.8 Power Equip. Operator - Commercial	**11/01/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$58.23	$74.72	$91.21
Apprentice: Level 1 0 - 6 Months	$48.34	$59.88	$71.43
Apprentice: Level 2 7 -12 Months	$49.99	$62.37	$74.73
Apprentice: Level 3 13 - 18 Months	$51.63	$64.82	$78.01
Apprentice: Level 4 19 - 24 Months	$53.29	$67.31	$81.33
Apprentice: Level 5 25 - 30 Months	$54.93	$69.78	$84.61
Apprentice: Level 6 25 - 30 Months	$56.59	$72.27	$87.93

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
5.1 Truck Driver Class			**01/05/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$54.10	$70.52	$86.94

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Articulated Hauler			**10/28/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.02	$81.91	$100.79
Apprentice: Apprentice Level 1	$51.70	$64.93	$78.15
Apprentice: Apprentice Level 2	$53.59	$67.76	$81.93
Apprentice: Apprentice Level 3	$55.48	$70.60	$85.71
Apprentice: Apprentice Level 4	$57.36	$73.42	$89.47
Apprentice: Apprentice Level 5	$59.25	$76.25	$93.25
Apprentice: Apprentice Level 6	$61.13	$79.07	$97.01

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Asbestos abatement worker or environmental remediation worker	**11/01/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$56.20	$73.24	$90.28
Apprentice: Trainee 600 hours +1 year	$43.12	$55.01	$66.90

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Boilermaker			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$79.64	$119.12	$158.58
Apprentice: 1st Period	$58.07	$86.78	$115.44
Apprentice: 2nd Period	$59.89	$89.50	$119.08
Apprentice: 3rd Period	$61.81	$92.24	$122.74
Apprentice: 4th Period	$63.50	$94.91	$126.30
Apprentice: 5th Period	$65.26	$97.54	$129.82
Apprentice: 6th Period	$68.89	$103.00	$137.08
Apprentice: 7th Period	$72.46	$108.36	$144.22
Apprentice: 8th Period	$76.07	$113.77	$151.44

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Boom Truck			**10/28/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$70.31	$92.84	$115.37
Apprentice: Apprentice Level 1	$56.81	$72.59	$88.37
Apprentice: Apprentice Level 2	$59.06	$75.97	$92.87
Apprentice: Apprentice Level 3	$61.31	$79.35	$97.37
Apprentice: Apprentice Level 4	$63.56	$82.72	$101.87

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Bricklayer			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$59.07	$76.05	$93.02
Apprentice: Apprentice Level 1	$40.99	$51.90	$62.80
Apprentice: Apprentice Level 2	$42.83	$54.66	$66.48
Apprentice: Apprentice Level 3	$44.68	$57.43	$70.18
Apprentice: Apprentice Level 4	$46.53	$60.21	$73.88
Apprentice: Apprentice Level 5	$48.37	$62.97	$77.56
Apprentice: Apprentice Level 6	$50.22	$65.74	$81.26
Apprentice: Apprentice Level 7 & 8	$52.07	$68.52	$84.96

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Carpenter			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$60.20	$78.38	$96.56
Apprentice: Apprentice Level 1	$49.29	$62.02	$74.74
Apprentice: Apprentice Level 2	$51.11	$64.75	$78.38
Apprentice: Apprentice Level 3	$54.75	$70.21	$85.66
Apprentice: Apprentice Level 4	$58.95	$76.51	$94.06

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Carpet layers (linoleum)			**11/03/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$53.72	$70.77	$87.81
Apprentice: Level 1	$43.49	$55.42	$67.35
Apprentice: Level 2	$45.20	$57.99	$70.77
Apprentice: Level 3	$48.61	$63.10	$77.59
Apprentice: Level 4	$52.02	$68.22	$84.41

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Cement Mason			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$55.78	$71.69	$87.60
Apprentice: Apprentice Level 1	$42.00	$53.93	$65.86
Apprentice: Apprentice Level 2	$43.73	$56.53	$69.32
Apprentice: Apprentice Level 3	$45.51	$59.20	$72.88
Apprentice: Apprentice Level 4	$47.19	$61.72	$76.24
Apprentice: Apprentice Level 5 & 6	$48.93	$64.33	$79.72

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Drywall taper			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$52.69	$67.80	$82.91
Apprentice: Level 1	$42.11	$51.93	$61.75
Apprentice: Level 2	$45.13	$56.46	$67.79
Apprentice: Level 3	$49.67	$63.27	$76.87

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Electrician			**10/31/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$69.95	$99.93	$129.90
Apprentice: Apprentice Level 1	$28.38	$38.15	$47.91
Apprentice: Apprentice Level 2	$33.25	$45.45	$57.65
Apprentice: Apprentice Level 3	$38.13	$52.78	$67.41
Apprentice: Apprentice Level 4	$40.58	$56.45	$72.31
Apprentice: Apprentice Level 5	$45.46	$63.77	$82.07
Apprentice: Apprentice Level 6	$51.56	$72.92	$94.27

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Additional Jurisdiction Detail: Townships of Jasper, Porter, Mount Haley and Ingersol ONLY.

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Electrician	**10/29/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$66.52	$94.69	$122.86
Apprentice: Apprentice Level 1	$26.27	$36.27	$46.26
Apprentice: Apprentice Level 2	$28.49	$39.60	$50.70
Apprentice: Apprentice Level 3	$30.71	$42.93	$55.14
Apprentice: Apprentice Level 4	$35.54	$50.17	$64.80
Apprentice: Apprentice Level 5	$37.98	$53.83	$69.68
Apprentice: Apprentice Level 6	$45.29	$64.80	$84.30

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Additional Jurisdiction Detail: All Townships EXCEPT Mount Haley, Jasper, Porter and Ingersoll.

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Elevator Constructor			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$110.76	$143.49	$176.21
Apprentice: 4th Year	$95.57	$121.75	$147.93

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Elevator Constructors			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$110.76	$143.49	$176.21

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Glaziers			**10/31/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$56.55	$76.37	$96.20
Apprentice: Level 1	$40.70	$52.61	$64.50
Apprentice: Level 2	$44.66	$58.55	$72.42
Apprentice: Level 3	$48.63	$64.50	$80.36
Apprentice: Level 4	$52.59	$70.44	$88.28

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Ground Person			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$50.85	$72.32	$93.78

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Heating and frost Insulators			**11/03/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.85	$83.85	$103.85
Apprentice: 1st period	$44.28	$56.28	$68.28
Apprentice: 2nd period	$49.17	$63.17	$77.17
Apprentice: 3rd period	$54.06	$70.06	$86.06
Apprentice: 4th period	$58.96	$76.96	$94.96

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Friday for cancelled work in a 4 10 schedule

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Ironworker			**10/31/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$75.42	$93.70	$111.97
Apprentice: Apprentice Level 1	$57.42	$70.40	$83.37
Apprentice: Apprentice Level 2	$59.59	$73.12	$86.64
Apprentice: Apprentice Level 3	$61.54	$75.43	$89.32
Apprentice: Apprentice Level 4	$64.59	$79.40	$94.20
Apprentice: Apprentice Level 5	$67.64	$83.36	$99.07
Apprentice: Apprentice Level 6	$75.42	$93.70	$111.97

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Laborer, Common - Highway & Heavy	**11/05/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$48.27	$62.46	$76.64
Apprentice: Level 1	$41.09	$51.73	$62.37
Apprentice: Level 2	$42.51	$53.86	$65.21
Apprentice: Level 3	$43.92	$55.98	$68.03
Apprentice: Level 4	$46.76	$60.24	$73.71

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Laborer, Landscaping	**11/03/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$36.87	$49.23	$61.58
Apprentice: Apprentice Level 1	$30.69	$39.96	$49.22
Apprentice: Apprentice Level 2	$31.93	$41.82	$51.70
Apprentice: Apprentice Level 3	$33.16	$43.66	$54.16
Apprentice: Apprentice Level 4	$35.63	$47.37	$59.10

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Laborer, Skilled - Commercial			**11/04/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$42.02	$56.13	$70.23

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Laborer, Skilled - Highway & Heavy	**11/05/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$49.27	$63.96	$78.64
Apprentice: Apprentice Level 1	$41.84	$52.86	$63.87
Apprentice: Apprentice Level 2	$43.31	$55.06	$66.81
Apprentice: Apprentice Level 3	$44.68	$57.16	$69.64
Apprentice: Apprentice Level 4	$47.71	$61.66	$75.61

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Landscaping equipment			**10/28/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$39.09	$52.56	$66.02

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Lineman			**10/30/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$76.81	$111.26	$145.70
Apprentice: Level 1 0-1000 hours	$49.26	$69.94	$90.60
Apprentice: Level 2 1001-2000 Hours	$52.71	$75.11	$97.50
Apprentice: Level 3 2001-3000 Hours	$56.15	$80.28	$104.38
Apprentice: Level 4 3001-4000 hours	$59.60	$85.44	$111.28
Apprentice: Level 5 4001-5000 Hours	$63.04	$90.60	$118.16
Apprentice: Level 6 5001-6000 Hours	$66.48	$95.77	$125.04
Apprentice: Level 7	$69.93	$100.94	$131.94

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Low Voltage Technician			**01/27/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$44.28	$61.96	$79.63
Apprentice: Level 1	$23.10	$32.44	$41.77
Apprentice: Level 2	$26.47	$37.49	$48.51
Apprentice: Level 3	$29.87	$42.60	$55.31
Apprentice: Level 4	$33.26	$47.68	$62.09

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Additional Jurisdiction Detail: All Townships EXCEPT Mount Haley, Jasper, Porter and Ingersoll.

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Low Voltage Technician			**02/05/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$47.61	$66.95	$86.27
Apprentice: Level 1	$23.00	$32.15	$41.30
Apprentice: Level 2	$26.66	$37.64	$48.62
Apprentice: Level 3	$30.32	$43.15	$55.94
Apprentice: Level 4	$33.98	$48.63	$63.26

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Additional Jurisdiction Detail: Townships of Jasper, Porter, Mount Haley and Ingersol ONLY.

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Millwright			**11/05/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$82.65	$126.09	$165.30
Apprentice: Level 1	$60.79	$91.21	$121.58
Apprentice: Level 2	$68.09	$102.15	$136.18
Apprentice: Level 3	$75.36	$113.05	$150.72
Apprentice: Level 4	$79.01	$118.54	$158.02

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Off-Road Truck			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.02	$81.91	$100.79
Apprentice: Apprentice Level 1	$51.70	$64.93	$78.15
Apprentice: Apprentice Level 2	$53.59	$67.76	$81.93
Apprentice: Apprentice Level 3	$55.48	$70.60	$85.71
Apprentice: Apprentice Level 4	$57.36	$73.42	$89.47
Apprentice: Apprentice Level 5	$59.25	$76.25	$93.25
Apprentice: Apprentice Level 6	$61.13	$79.07	$97.01

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Painters			**10/30/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$48.48	$63.10	$77.71
Apprentice: Apprentice Level 1	$36.79	$45.56	$54.33
Apprentice: Apprentice Level 2	$39.71	$49.94	$60.17
Apprentice: Apprentice Level 3	$42.63	$54.32	$66.01
Apprentice: Apprentice Level 4	$45.56	$58.72	$71.87

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Piledriver			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$60.20	$78.38	$96.56
Apprentice: Apprentice Level 1	$49.29	$62.02	$74.74
Apprentice: Apprentice Level 2	$51.11	$64.75	$78.38
Apprentice: Apprentice Level 3	$54.75	$70.21	$85.66
Apprentice: Apprentice Level 4	$58.95	$76.51	$94.06

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Pipefitters—Steamfitters			**11/01/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$63.84	$84.35	$104.85
Apprentice: Level 1	$38.67	$48.92	$59.17
Apprentice: Level 2	$41.30	$52.58	$63.86
Apprentice: Level 3	$43.90	$56.21	$68.51
Apprentice: Level 4	$46.50	$59.83	$73.16
Apprentice: Level 5	$49.10	$63.46	$77.81
Apprentice: Level 6	$51.70	$67.08	$82.46
Apprentice: Level 7	$54.30	$70.71	$87.11
Apprentice: Level 8	$56.90	$74.33	$91.76
Apprentice: Level 9	$59.50	$77.95	$96.41

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Plasterer			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$57.16	$72.50	$87.84
Apprentice: Apprentice Level 1	$43.02	$54.40	$65.78
Apprentice: Apprentice Level 2	$44.75	$56.99	$69.24
Apprentice: Apprentice Level 3	$46.48	$59.59	$72.70
Apprentice: Apprentice Level 4	$48.20	$62.17	$76.14
Apprentice: Apprentice Level 5 & 6	$49.93	$64.77	$79.60

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Plumbers			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$69.18	$92.18	$115.18
Apprentice: Level 1	$41.55	$53.05	$64.55
Apprentice: Level 2	$44.39	$57.04	$69.69
Apprentice: Level 3	$47.24	$61.04	$74.84
Apprentice: Level 4	$50.09	$65.04	$79.99
Apprentice: Level 5	$52.94	$69.04	$85.14
Apprentice: Level 6	$55.79	$73.04	$90.29
Apprentice: Level 7	$58.64	$77.04	$95.44
Apprentice: Level 8	$61.49	$81.04	$100.59
Apprentice: Level 9	$64.34	$85.04	$105.74

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Roofer/Waterproofer			**11/03/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$49.76	$63.95	$78.14
Apprentice: Apprentice 1	$35.27	$42.22	$49.16
Apprentice: Apprentice 2	$36.91	$44.68	$52.44
Apprentice: Apprentice 3	$36.31	$43.78	$51.24
Apprentice: Apprentice 4	$37.93	$46.20	$54.48
Apprentice: Apprentice 5	$34.45	$40.98	$47.52
Apprentice: Apprentice 6	$41.18	$51.08	$60.98
Apprentice: Apprentice 7	$42.51	$53.08	$63.64
Apprentice: Apprentice 8	$44.42	$55.94	$67.46

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Sheet Metal Workers			**10/31/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$67.48	$86.53	$105.58
Apprentice: Level 1	$36.88	$48.31	$59.74
Apprentice: Level 2	$38.98	$51.37	$63.75
Apprentice: Level 3	$45.95	$59.29	$72.62
Apprentice: Level 4	$50.14	$65.38	$80.62

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Sprinkler Fitters			**11/03/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$60.34	$78.45	$96.56
Apprentice: Class 1	$24.57	$32.72	$40.87
Apprentice: Class 10	$52.07	$68.37	$84.67
Apprentice: Class 2	$26.38	$35.43	$44.49
Apprentice: Class 3	$39.14	$49.10	$59.06
Apprentice: Class 4	$40.95	$51.82	$62.68
Apprentice: Class 5	$43.01	$54.78	$66.55
Apprentice: Class 6	$44.82	$57.49	$70.17
Apprentice: Class 7	$46.63	$60.21	$73.79
Apprentice: Class 8	$48.45	$62.94	$77.43
Apprentice: Class 9	$50.26	$65.65	$81.05

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name	Last Updated
Terrazzo Worker	**10/29/2025**

Wage Rates	Straight Time	Time and a Half	Double Time
Journeyman	$53.82	$68.77	$83.72
Apprentice: Apprentice Level 1	$40.55	$49.87	$59.18
Apprentice: Apprentice Level 2	$42.29	$52.48	$62.66
Apprentice: Apprentice Level 3	$44.02	$55.07	$66.12
Apprentice: Apprentice Level 4	$45.76	$57.68	$69.60
Apprentice: Apprentice Level 5	$47.49	$60.28	$73.06
Apprentice: Apprentice Level 6	$49.23	$62.89	$76.54
Apprentice: Apprentice Level 7 & 8	$50.95	$64.75	$79.02

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Terrazzo Workers			**04/16/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$53.82	$68.77	$83.72
Apprentice: 27.31	$49.13	$62.74	$76.34
Apprentice: Level 1	$40.46	$49.73	$59.00
Apprentice: Level 2	$42.25	$52.41	$62.58
Apprentice: Level 3	$44.05	$55.12	$66.18
Apprentice: Level 4	$45.84	$57.80	$69.76
Apprentice: Level 5	$47.63	$60.49	$73.34
Apprentice: Level 7 and 8	$50.92	$65.42	$79.92

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Tile Finisher			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$49.30	$62.80	$76.30
Apprentice: Apprentice Level 1	$40.67	$50.86	$61.04
Apprentice: Apprentice Level 2	$42.20	$53.15	$64.10
Apprentice: Apprentice Level 3	$44.60	$55.94	$67.28
Apprentice: Apprentice Level 4	$43.72	$55.43	$67.14
Apprentice: Apprentice Level 5 & 6	$46.77	$46.77	$46.77

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Tile Finishers			**04/17/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$49.30	$62.80	$76.30
Apprentice: Level 1	$40.82	$51.08	$61.34
Apprentice: Level 2	$42.17	$53.11	$64.04
Apprentice: Level 3	$43.79	$55.53	$67.28
Apprentice: Level 4	$46.76	$59.99	$73.22

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Tile Setter			**10/29/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$53.32	$68.02	$82.72
Apprentice: Apprentice Level 1	$40.24	$49.40	$58.56
Apprentice: Apprentice Level 2	$41.95	$51.97	$61.98
Apprentice: Apprentice Level 3	$43.65	$54.52	$65.38
Apprentice: Apprentice Level 4	$45.36	$57.08	$68.80
Apprentice: Apprentice Level 5	$47.06	$59.63	$72.20
Apprentice: Apprentice Level 6	$48.77	$62.20	$75.62
Apprentice: Apprentice Level 7 & 8	$50.47	$64.75	$79.02

Four 10-hour days allowed? - No

Make Up Day Allowed? - No

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Tile Setters			**04/17/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$53.32	$68.02	$82.72
Apprentice: Level 1	$40.15	$49.27	$58.38
Apprentice: Level 2	$41.91	$51.90	$61.90
Apprentice: Level 3	$43.68	$54.56	$65.44
Apprentice: Level 4	$45.44	$57.20	$68.96
Apprentice: Level 5	$47.20	$59.84	$72.48
Apprentice: Level 6	$48.67	$62.05	$75.42
Apprentice: Level 7 and 8	$50.44	$64.70	$78.96

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Tunnel Miner			**11/03/2025**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$52.82	$70.02	$87.22
Apprentice: Level 1	$44.22	$57.12	$70.02
Apprentice: Level 2	$45.94	$59.70	$73.46
Apprentice: Level 3	$47.66	$62.28	$76.90
Apprentice: Level 4	$51.10	$61.35	$75.66

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

Prevailing Wage Rates for State Of Michigan Funded Projects

Official Rate Schedule

Midland

Classification Name			Last Updated
Underground and Open Cut Laborer			**01/06/2026**
Wage Rates	**Straight Time**	**Time and a Half**	**Double Time**
Journeyman	$47.67	$62.03	$76.39
Apprentice: Level 1	$40.49	$51.26	$62.03
Apprentice: Level 2	$41.93	$53.42	$64.91
Apprentice: Level 3	$43.36	$55.57	$67.77
Apprentice: Level 4	$46.23	$59.87	$73.51

Four 10-hour days allowed? - Yes

Make Up Day Allowed? - Yes

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. 7th 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 44th 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 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

Middle School

1. ADD – Include lighting replacement in storage rooms adjacent to classrooms and lighting replacement in the office area
2. ADD – Remove and replace existing lockers in lieu of painting existing lockers.

Floyd Elementary

1. ADD – Sand and repaint existing lockers in east classroom wing.

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 attend 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 CORPORATION

Submittal Review

Project No: _____ By: _____

Building Name: _____

Bid Division & No.:_____

Spec Section No.:_____

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

WOLGAST CORPORATION 4835 TOWNE CENTRE ROAD, SUITE 203, SAGINAW, MI 48604 PH 989-790-9120 FX 989-790-9063

PART 1 – GENERAL

1.01CONSTRUCTION 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 to provide 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.

A. 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 handless 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 the 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 comsumption 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 convenient nearby 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:

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 waranty/ 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, identifying 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 always worn. 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 should 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 Contactor(s) responsible for these controls in the event such controls have not been implemented. The Contractor(s) agrees 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 specifications 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 accordance 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-week 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 closeout 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 closeout 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 people 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, 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 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 if stipulated in the specifications).

C. The Contractor shall further provide all suppliers, 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 districts 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 **Bullock Creek School District** as they pertain to hazardous materials.

The SDS's are attached for all hazardous materials which will be brought to **Bullock Creek School District.**

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.

_____ Date: _____

Signature of Contractor's Representative

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 **Bullock Creek School District**.

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: **Bullock Creek School District – 2024 Bond Series 2 - 2027 Improvements**
Project #: **A26909**
Owner: **Bullock Creek School District**
Address: **1420 S Badour Road, Midland, MI 48640**

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: Bullock Creek School District.**

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 Bullock Creek School District 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 subcontractor 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

NORTHERN
Analytical Services, LLC.
ENVIRONMENTAL CONSULTANTS

Three Year Asbestos Re-Inspection Report

For

Bullock Creek School District
1420 South Badour Road
Midland, Michigan 48640

Prepared By:

Northern Analytical Services, LLC.
PO Box 1604
Big Rapids, Michigan 49307

Project No.: 240181
Report Date: October 04, 2024

14870 225th Ave., Big Rapids, Michigan 49307
Phone : 231-268-0004 Fax : 866-214-4739 Web : www.northernas.com

Bullock Creek School District
3 Year Re-Inspection Report
Project No.: 240181
Report Date: October 4, 2024

Table of Contents

Introduction 2
Company Statement 4
Asbestos Background 5
Survey Procedures 5
Unknown Suspect Materials 5
Facility Recommendations 6
Management Planner's Recommendations 8
School Building Number 1 - Bullock Creek High School 8
School Building Number 2 - Bullock Creek Middle School 8
School Building Number 3 - Bullock Creek Elementary School 8
School Building Number 4 - Floyd Elementary School 8
School Building Number 5 - Pine River Elementary School 9
Inspection Statement 10
Management Plan Statement 10
Local Education Information 11
Training Certification 11
LEA Responsibility Certification 12
Annual Notification 13
Appendix A 14
Notifications & Forms 14
Annual AHERA Notification 15
Asbestos Removal Notification 16
Asbestos Acknowledgement 17
Periodic Surveillance 18
Appendix B 23
Inspection Data 23

Introduction

The following Three-Year Asbestos Re-Inspection Report was completed by Northern Analytical Services, LLC. (NAS) for Bullock Creek School District located at 1420 South Badour Road, Midland, Michigan 48640. Re-inspection activities were limited to the known or assumed asbestos containing materials identified in the previous re-inspection report.

In accordance with the US EPA under the National Emissions Standard for Hazardous Air Pollutants (NESHAPs), building owners and their contractors are responsible for having building materials tested for asbestos content prior to disturbance. This re-inspection is not intended to satisfy NESHAP requirements; Additional inspection and testing services will be necessary before performing renovations or other activities that will otherwise disturb building materials.

In accordance with the Asbestos Hazard Emergency Response Act (AHERA), all buildings owned and/or operated by K-12 school districts are required to be incorporated in the district's management plan. These regulations allow for buildings, or portions of buildings, constructed after 1988 to either be inspected for the presence of asbestos containing materials (ACM) or be accompanied by a statement from the architect/construction manager that no ACM was installed during construction activities. It is recommended that acceptable statements be obtained and attached to this report for any future renovation/construction activities.

Notable buildings/structures observed during this re-inspection but are not a part of the district's management plan include Bus Garage, Press Box, Concessions Building, Baseball and Softball Dugouts and Storage Buildings. NAS recommends these buildings be inspected for the presence of ACM and added to the district's management plan.

Bullock Creek School District
3 Year Re-Inspection Report
Project No.: 240181
Report Date: October 4, 2024

This re-inspection included the following buildings:

School Building Number	Building	Address	Re-Inspection Date
1	Bullock Creek High School	1420 South Badour Road, Midland, Michigan 48640	9/12/2024
2	Bullock Creek Middle School	644 South Badour Road, Midland, Michigan 48640	9/12/2024
3	Bullock Creek Elementary School	1037 Poseyville Road, Midland, Michigan 48640	9/12/2024
4	Floyd Elementary School	725 South 8 Mile Road, Midland, Michigan 48640	9/12/2024
5	Pine River Elementary School	1894 East Pine River Road, Midland, Michigan 48640	9/12/2024

Company Statement

This Re-inspection Report and Management Plan update was prepared by NAS to assist Bullock Creek School District in meeting the 3 Year Re-Inspection requirements set forth by AHERA.

In preparation of this document, every attempt has been made to recommend the least burdensome response actions consistent with protecting human health and the environment as specified by AHERA.

AHERA states that the management plan is the responsibility of the owner/operator of the facility, also called the Local Education Agency (LEA); in this case the LEA is Bullock Creek School District. It is the responsibility of the LEA to read and understand the response actions, their obligations, timetables, and to determine if these actions are reasonable actions prior to signing the owner/operator statement. Any changes or additions to this document without written authorization from NAS will automatically void the inspection and management plan statements.

If the LEA decides to make changes to this report without authorization from NAS or decides to make changes which conflict with the advice and/or professional judgment of NAS, a separate statement shall accompany the management plan and should specify which recommended actions the owner/operator has decided to change, the actual changes and rationale for the changes. NAS will not accept any responsibility for changes to any response actions that weren't stated previously by NAS.

Asbestos Background

Asbestos is a naturally occurring mineral. It is distinguished from other minerals by the fact that its crystals form long, thin fibers. Deposits of asbestos are found throughout the world. The primary sites of commercial production are Canada, China, Brazil, Zimbabwe, and South Africa. Asbestos is also mined commercially in limited quantities in the United States, in California and Vermont.

Asbestos has been used in thousands of products. Collectively, these are referred to as asbestos-containing material (ACM). Asbestos gained wide-spread use because it was plentiful, readily available and low in cost. Because of its unique properties – fire resistance, high tensile strength, poor heat and electrical conductivity and being generally impervious to chemicals attacks – asbestos proved well-suited for many uses in the construction trades.

Asbestos-related diseases are chronic diseases and symptoms usually do not appear for 15 to 40 years after initial exposures to airborne asbestos fibers. In nearly all cases, many years of exposure to high levels of airborne ACM is necessary for personnel to contract asbestos-related diseases.

The primary exposure route is inhalation. Inhaled fibers may become embedded in the bronchial tubes or alveoli, or they may pass through to the pleura – the lining of the chest cavity. Asbestos-related diseases include asbestosis, lung cancer, mesothelioma and gastrointestinal cancers.

Survey Procedures

Survey procedures were conducted by a State of Michigan accredited Asbestos Building Inspector in accordance with AHERA requirements.

To complete this survey, the inspector(s) reviewed the most recent re-inspection report and performed an inspection of the materials identified in that report as either known or assumed to be asbestos containing. During the inspection, the inspector visually inspected materials for damage or the potential for damage.

NAS did not conduct a thorough inspection of the building(s) to determine the presence, location, or quantity of materials suspected to contain asbestos. NAS only inspected the materials identified in the previous re-inspection. Prior to performing any renovation work NAS strongly recommends a thorough building inspection be performed.

Unknown Suspect Materials

It is likely that there are suspect asbestos containing materials present that have not been identified in this re-inspection or in previous AHERA inspections. Keep in mind

that in 1988 when AHERA was enacted many inspectors were new and likely missed some of the suspect materials. Additionally, new building materials have likely been added since the original AHERA inspection. It is a common misconception that asbestos has been banned, it is still legal to sell many types of building materials yet today that contain asbestos.

In addition to unknown/untested materials, many known asbestos containing materials have been removed over the years through renovation or maintenance activities. It is possible that the conditions at the time work was completed would not allow for complete removal and some portion of the ACM remain. The following are examples of this:

- Cabinets and unit vent heaters cover old floor tile.
- Floor tile was removed but the asbestos containing mastic remains and was covered with new flooring.
- Pipe insulation was abated where exposed but the asbestos insulation extends into a wall cavity.
- Spray applied acoustical ceilings were scrapped but the non-asbestos plaster substrate remains along with asbestos containing overspray above it.
- Spray applied fire proofing was removed but residual overspray remains in wall cavities and other hidden areas.

To help ensure suspect ACMs are not unknowingly disturbed it is crucial that the NESHAP regulations are closely followed and every space be thoroughly inspected and every building material be tested prior to disturbance. This report does not cover unknown or hidden suspect materials.

Facility Recommendations

Based on the findings of the Inspector, the following general site recommendations have been made:

Careful review of the included Response Action Report should be conducted by the Districts Designated Person. The reports titled Material Report will provide a detailed description of the suspect ACM found, asbestos content, friability, type of asbestos present, and the total quantity found in each building. Reports titled Response Action Report will provide a description of what ACMs were found in each room, comments on the specific location and damage if any was observed and response actions to be taken for each of the known or assumed ACM.

For materials that have been identified as damaged, it is recommended that a licensed abatement contractor be contacted to make any repairs or to conduct any removal activities needed.

In accordance with CFR 1910.1200, it is recommended that each ACM be properly labeled as asbestos containing. Warning labels should contain the following information:

Danger
Contains Asbestos Fibers
Avoid Creating Dust
Cancer and Lung Disease Hazard

Labels should be placed in various locations on each material in a manner to avoid accidental disturbance.

Prior to any renovation or maintenance activity, review the Management Plan to ensure materials being impacted by the renovation/activity do not contain asbestos. Should materials likely to be disturbed not be accurately described in the inspection reports, contact a licensed Asbestos Building Inspector to collect samples. Do not disturb materials not described in the Management Plan or materials identified as asbestos containing or assumed to contain asbestos.

If a disturbance occurs, either accidental or planned (abatement project), area air monitoring should be conducted to establish the airborne concentration of asbestos fibers present. Both State and Federal Agency strictly govern disturbance activities and exposure to employees and building occupants. Proper air sampling can determine if area contamination has occurred as well as help assure employees and building occupants in adjacent areas are not being exposed. In addition to area monitoring, AHERA requires third party area air clearance testing whenever a disturbance occurs.

Records of future renovation activities should be kept. These records should include what materials where disturbed and to what extent. Also, information on replacement materials is vital in keeping this survey up to date. Often Architects or Design Engineers can provide legal statements indicating that replacement materials do not contain asbestos. Other documentation of this sort would be material or product safety data sheets. If proper documentation is not available for suspect ACM’s located in building constructed prior to 1986, sample collection and analysis is required by State and Federal Regulations.

Both CFR 1910.110 and CFR 1926.110 require that employers provide awareness training to all employees that are expected to come in contact with or required to work in the general vicinity of ACM. In accordance with regulatory requirements, it is recommended that all housekeeping and maintenance employees receive, at a minimum, 2-hour asbestos awareness training. In addition, employees that are required to conduct minor cleanup projects shall be provided additional training.

Management Planner's Recommendations

All of the ACM or suspect ACM identified in this report was noted by the inspector as being in good condition unless specifically mentioned below under each building name. Continue the facility's operations and maintenance program and conduct periodic assessments (at least every 6 months) of all known or assumed asbestos containing materials.

The following recommendations (not all inclusive, see Response Actions for additional recommendations) are based on the inspector's findings, laboratory results and the management planner's opinion. Please note that all work described below must be completed either by in house properly trained 16-hour asbestos operations and maintenance personnel or a licensed asbestos abatement contractor. Third-party air clearance testing should be conducted following any repair/removal actions described below:

School Building Number 1 - Bullock Creek High School

1. All known friable ACM observed during this re-inspection was found to be in good condition with the following exceptions:
   A) Room 23 (Gym Balcony) – There is 1 damaged roof drain and 2 damaged mudded pipe fittings that require repair/removal. Both materials are around 20' from the floor.

School Building Number 2 - Bullock Creek Middle School

1. All known friable ACM observed during this re-inspection was found to be in good condition, continue to maintain materials in accordance with the Operations and Maintenance Program.

School Building Number 3 - Bullock Creek Elementary School

1. All known friable ACM observed during this re-inspection was found to be in good condition, continue to maintain materials in accordance with the Operations and Maintenance Program.

School Building Number 4 - Floyd Elementary School

1. All known friable ACM observed during this re-inspection was found to be in good condition, continue to maintain materials in accordance with the Operations and Maintenance Program.

School Building Number 5 - Pine River Elementary School

1. All known friable ACM observed during this re-inspection was found to be in good condition, continue to maintain materials in accordance with the Operations and Maintenance Program.

Signature Page

Inspection Statement

The person(s) listed below hereby attest(s) that he/she/they did inspect, assess and perform sampling of suspect asbestos containing building materials (ACBM) at the buildings/portions of buildings listed in this report in accordance with AHERA regulations set forth in 40 CFR Section 763.85(a):

Name	Accreditation Number	Signature	Date
Kevin Delancey	A39427		10/4/2024

Management Plan Statement

The person(s) listed below hereby attest(s) that he/she/they did review the asbestos re-inspection data collected by the asbestos building inspector for this re-inspection. Any recommendations are based on the above referenced inspection in accordance with AHERA regulations set forth in 40 CFR Section 763.93 (12), (ii).

Name	Accreditation Number	Signature	Date
John Rehkopf	A16809		10/4/2024

Bullock Creek School District
3 Year Re-Inspection Report
Project No.: 240181
Report Date: October 4, 2024

Local Education Information
Local Education Agency (LEA): Bullock Creek School District
LEA Address: 1420 South Badour Road, Midland, Michigan 48640
Designated Person: Shawn Hale
Designated Person Address: 1420 South Badour Road, Midland, Michigan 48640
Designated Person Telephone: 989-631-9022

Training Certification
The Designated Person(s) listed above attests that he/she/they received adequate training covering the Local Education Agency's (LEA) responsibilities for Designated Person in accordance with 763.93 (e)(4). This training included:

- The health effects of asbestos exposure
- Detection, identification and assessment of ACBM
- Options for controlling ACBM
- Asbestos management programs
- Relevant State and Federal regulations regarding asbestos
- The LEA/Designated Person responsibilities.

Training was provided by: Northern Analytical Services, LLC.

Under the course titled: Asbestos Designated Person Training

on: 9/12/2024 and was 3 hours in length.

Designated Person Signature: _____ _____
Shawn Hale Date

LEA Responsibility Certification

The Designated Person listed above certifies that the general LEA responsibilities as required by 763.84 have been or will be satisfied. This includes the following actions:

1. Anyone who conducts any inspections, re-inspections or abatement projects; develops or updates management plans; or performs operations and maintenance that will disturb ACM are licensed asbestos professionals.
2. All custodial and maintenance staff have received two-hour asbestos awareness training and 14 hours of operations and maintenance training (along with annual refreshers) as described in AHERA.
3. The parents, teachers and employee organizations are notified on an annual basis of all inspections, response actions and periodic surveillance that are planned or in progress in regard to asbestos in each school building.
4. Short-term workers (e.g., telephone repair workers, utility workers or exterminators) are informed of the locations of ACBM in school buildings.
5. Warning signs are posted immediately adjacent to ACM in routine maintenance areas that state:

   Danger. Asbestos. Hazardous.
   Do Not Disturb
   Without Proper Training and Equipment

6. Parents, teachers and employee organizations are notified in writing on an annual basis of the availability of the school's asbestos management plan.
7. The management plans are available for inspection in each school and the district office.
8. Records are properly maintained.
9. Each management plan contains a statement, signed by the designated person that certifies the LEA's responsibilities have been or will be met. The statement needs to be amended for each new designated person chosen by the LEA.
10. Re-inspections are conducted at least once every three years after a management plan is in effect.

As the Designated Person for Bullock Creek School District, I will ensure that the above items are completed in accordance with AHERA.

_____	_____	_____
Signature of Designated Person	Shawn Hale	Date

Annual Notification

Annual AHERA Notifications to Employees, Students, and Parents.

The Asbestos Hazard Emergency Response Act (AHERA) requires schools to "ensure that workers and building occupants, or their legal guardians, are informed at least once each school year about inspections, response actions, and post-response action activities, including periodic reinspection and surveillance activities that are planned or in progress (763.84(c)). Such notification must be done in writing and a copy placed in the management plan. Suggested notification methods may be through the publication of an article in a school district newsletter or through a separate written notice distributed to staff and sent home to a student's parent or legal guardian.

In addition, schools "shall make management plans available for inspection to representatives of EPA and the State, the public, including parents, teachers, and other school personnel within 5 working days after receiving a request for inspection (763.93(g)(3)). Furthermore, "the local education agency shall notify in writing parent, teacher, and employee organizations of the availability of management plans and shall include in the management plan a description of steps to notify such organizations, and a dated copy of the notification. In the absence of any such organizations for parents, teachers, or employees, the local education agency shall provide written notice to that relevant group of the availability of management plans and shall include in the management plan a description of the steps taken to notify such groups and a dated copy of the notification" (763.93(g)(4).

The LEA asbestos designated person for the school district is to ensure that these AHERA required notifications occur each school year. The school may determine when to do AHERA notification, as long as it occurs at least once each school year.

A copy of the annual notification can be found in Appendix A.

Appendix A
Notifications & Forms

Annual AHERA Notification

Bullock Creek School District has an Asbestos Management Plan in place in accordance with the Asbestos Hazard Emergency Response Act (AHERA). The plan is available for review in the main office. Please call Mr. Shawn Hale at (989-631-9022) to view during normal operational hours, 8AM to 4PM Monday through Friday with the exception of holidays.

In accordance with AHERA requirements, Bullock Creek School District has contracted Northern Analytical Services, LLC. (NAS) to perform all re-inspections of known asbestos containing materials present, to prepare written project designs for all response actions and to perform all post response action testing. As part of this plan, NAS performed the most recent 3-year re-inspection on 9/12/2024.

Over the past 12 months, the following materials were removed from our buildings:

In the next 12 months we are planning to remove the following materials from our buildings:

Prior to conducting any work that disturbs asbestos, Bullock Creek School District will notify all parents and building staff in advance.

Sincerely,

Shawn Hale
Bullock Creek School District

Asbestos Removal Notification

In an effort to provide our students with the best learning environment possible, Bullock Creek School District is planning a building improvement project that will require the disturbance of asbestos containing materials. We have retained the services of a State of Michigan accredited Asbestos Project Designer to prepare written specifications to help ensure the work is completed in the safest manner possible. All removal work will be performed by a State of Michigan licensed asbestos abatement contractor and overseen by a qualified third-party air quality testing firm.

Third party air clearance testing will be performed before the areas affected by the asbestos removal are returned to normal use.

Asbestos Removal is scheduled to be removed from the following buildings:

Building Name	Start Date	Completion Date

Please contact our District's Designated Person, Mr. Shawn Hale at 989-631-9022 with any questions.

Asbestos Acknowledgement

Asbestos containing materials (ACM)'s are located in various areas of Bullock Creek School District. All short-term workers (anyone performing work that may disturb any building materials) must first have received asbestos awareness training within the past 12 months and be made aware of the types, locations, and quantities of ACM present in our District. Training shall be in accordance with Part 602 Asbestos Standards for Construction-1926.1101, be at least 2 hours in length, and include the contents of our District's asbestos building survey.

A copy of the asbestos survey reports can be obtained by contacting the Asbestos Designated Person for Bullock Creek School District, Mr. Shawn Hale at 989-631-9022.

All short-term workers must return a signed copy of this form to Mr. Hale before disturbing any building materials.

By signing this form _____ of _____ acknowledges there is asbestos present in various areas of Bullock Creek School District and accepts all liability associated with repairing, cleaning, and testing should any representative of our company, or our sub-contractor(s) improperly disturb any asbestos containing material. In addition, I attest that all of our employees, sub-contractors and their employees who perform services at Bullock Creek School District that causes the disturbance of building materials have been provided asbestos awareness training within the past 12 months that specifically included information regarding the presence, location, and quantity of ACM at Bullock Creek School District.

Company Representative Legally Authorized to Sign this form:

_____ _____ _____

Signature Title Date

By signing below, you are attesting that you have received asbestos awareness training within the past 12 months that included information regarding the presence, location, and quantity of ACM at Bullock Creek School District.

Individual's name	Signature	Date of Training

Local Education Agency (LEA) Name

Bullock Creek School District

School Building Number/Name

1-Bullock Creek High School

Periodic Surveillance

1. Name of Person Performing the Surveillance:

Last	First	M.I.

2. Date of the Surveillance:

3. Description of any Changes in the Condition of the Materials:

Local Education Agency (LEA) Name

Bullock Creek School District

School Building Number/Name

2-Bullock Creek Middle School

Periodic Surveillance

1. Name of Person Performing the Surveillance:

Last	First	M.I.

2. Date of the Surveillance:

3. Description of any Changes in the Condition of the Materials:

Local Education Agency (LEA) Name

Bullock Creek School District

School Building Number/Name

3-Bullock Creek Elementary School

Periodic Surveillance

1. Name of Person Performing the Surveillance:

Last	First	M.I.

2. Date of the Surveillance:

3. Description of any Changes in the Condition of the Materials:

Local Education Agency (LEA) Name

Bullock Creek School District

School Building Number/Name

4-Floyd Elementary School

Periodic Surveillance

1. Name of Person Performing the Surveillance:

Last	First	M.I.

2. Date of the Surveillance:

3. Description of any Changes in the Condition of the Materials:

Local Education Agency (LEA) Name

Bullock Creek School District

School Building Number/Name

5-Pine River Elementary School

Periodic Surveillance

1. Name of Person Performing the Surveillance:

Last	First	M.I.

2. Date of the Surveillance:

3. Description of any Changes in the Condition of the Materials:

Appendix B
Inspection Data

Bullock Creek High School

Material Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Bullock Creek High School
Address: 1420 South Badour Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Thermal	Yes	Yes	Yes	10%	Chrysotile	1239	Ln.Ft.
3	Pipe Insulation-Mudded Roof Drain -	Thermal	Yes	Yes	Yes	---	Assumed	6	Ln.Ft.
22	Floor Tile & Mastic - 9 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	27420	Sq.Ft.
30	Laboratory Counter Top -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	6	Sq.Ft.
31	Texture - Popcorn Paint	Surfacing	Yes	Yes	Yes	---	Assumed	1600	Sq.Ft.
32	Tar, Felt & Associated Mastic Layers Under Wood Floor -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	8100	Sq.Ft.
33	Boiler Insulation -	Thermal	Yes	Yes	Yes	---	Assumed	0	Sq.Ft.
34	Caulk - On Exterior Steel Door Frame	Misc.	Category II Non-Friable	No	Yes	3%	Chrysotile	0	Each
35	Window Glazing - In Steel Door Frame	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.

** Non-Friable materials may become friable when damaged.*
*** May become regulated asbestos containing material (RACM) when damaged.*

Misc. = miscelleaneous material
Surfacing = surfacing material
Thermal = thermal system insulation
RACM = regulated asbestos containing material

Response Action Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek High School
Building No.: 1
Address: 1420 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
01	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2023	()
02	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
03	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
04	22	Floor Tile & Mastic - 9 inch	800	Sq.Ft.		maintain with O&M plan. (7)
04	31	Texture - Popcorn Paint	1600	Sq.Ft.	Encapsulated w/ Plywood	maintain with O&M plan. (7)
05	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
06	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
07	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2023	()
08	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2023	()
09	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
10	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
11	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
12	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.		maintain with O&M plan. (7)
13	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.		maintain with O&M plan. (7)
14	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.		maintain with O&M plan. (7)
15	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.		maintain with O&M plan. (7)

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek High School
Building No.: 1
Address: 1420 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
16	22	Floor Tile & Mastic - 9 inch	1000	Sq.Ft.		maintain with O&M plan. (7)
17	22	Floor Tile & Mastic - 9 inch	1000	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
18	22	Floor Tile & Mastic - 9 inch	1000	Sq.Ft.		maintain with O&M plan. (7)
19	22	Floor Tile & Mastic - 9 inch	1000	Sq.Ft.		maintain with O&M plan. (7)
20	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	2	Ln.Ft.		maintain with O&M plan. (7)
20	22	Floor Tile & Mastic - 9 inch	80	Sq.Ft.		maintain with O&M plan. (7)
21	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
22	22	Floor Tile & Mastic - 9 inch	200	Sq.Ft.		maintain with O&M plan. (7)
23	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	25	Ln.Ft.		maintain with O&M plan. (7)
23	32	Tar, Felt & Associated Mastic Layers Under Wood Floor -	8100	Sq.Ft.		maintain with O&M plan. (7)
23 (Balcony)	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	20	Ln.Ft.	2 Damaged, 20ft from Floor	remove or repair damage ASAP. (4)
23 (Balcony)	3	Pipe Insulation-Mudded Roof Drain -	4	Ln.Ft.	1 Damaged, NW Corner	remove or repair damage ASAP. (4)
23.1	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	7	Ln.Ft.		maintain with O&M plan. (7)
24	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	0	Ln.Ft.	Removed	(4)
24	3	Pipe Insulation-Mudded Roof Drain -	0	Ln.Ft.	Removed	(4)
25	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	21	Ln.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek High School
Building No.: 1
Address: 1420 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
26	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	0	Ln.Ft.	Removed in 2013	(4)
26	33	Boiler Insulation -	0	Sq.Ft.	Removed in 2013	(4)
26.1	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	5	Ln.Ft.		maintain with O&M plan. (7)
26.2	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	27	Ln.Ft.		maintain with O&M plan. (7)
26.3	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	10	Ln.Ft.		maintain with O&M plan. (7)
26.4	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	11	Ln.Ft.		maintain with O&M plan. (7)
26.5	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	2	Ln.Ft.		maintain with O&M plan. (7)
27	22	Floor Tile & Mastic - 9 inch		Sq.Ft.		maintain with O&M plan. (7)
28	22	Floor Tile & Mastic - 9 inch	300	Sq.Ft.		maintain with O&M plan. (7)
29	22	Floor Tile & Mastic - 9 inch	200	Sq.Ft.		maintain with O&M plan. (7)
30	22	Floor Tile & Mastic - 9 inch		Sq.Ft.		maintain with O&M plan. (7)
31	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
32	22	Floor Tile & Mastic - 9 inch	400	Sq.Ft.		maintain with O&M plan. (7)
33	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
34	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
35	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	900	Ln.Ft.		maintain with O&M plan. (7)

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek High School
Building No.: 1
Address: 1420 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
35	30	Laboratory Counter Top -	3	Sq.Ft.		maintain with O&M plan. (7)
36	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
36	30	Laboratory Counter Top -	3	Sq.Ft.		maintain with O&M plan. (7)
37	22	Floor Tile & Mastic - 9 inch	100	Sq.Ft.		maintain with O&M plan. (7)
38	22	Floor Tile & Mastic - 9 inch	100	Sq.Ft.		maintain with O&M plan. (7)
39	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
40	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.		maintain with O&M plan. (7)
41	22	Floor Tile & Mastic - 9 inch	600	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
42	22	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
42.1	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	13	Ln.Ft.		maintain with O&M plan. (7)
42.1	3	Pipe Insulation-Mudded Roof Drain -	2	Ln.Ft.		maintain with O&M plan. (7)
43	22	Floor Tile & Mastic - 9 inch	400	Sq.Ft.		maintain with O&M plan. (7)
44	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
45	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
46	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.		maintain with O&M plan. (7)
47	22	Floor Tile & Mastic - 9 inch	820	Sq.Ft.	Under 12x12 Tile	maintain with O&M plan. (7)

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

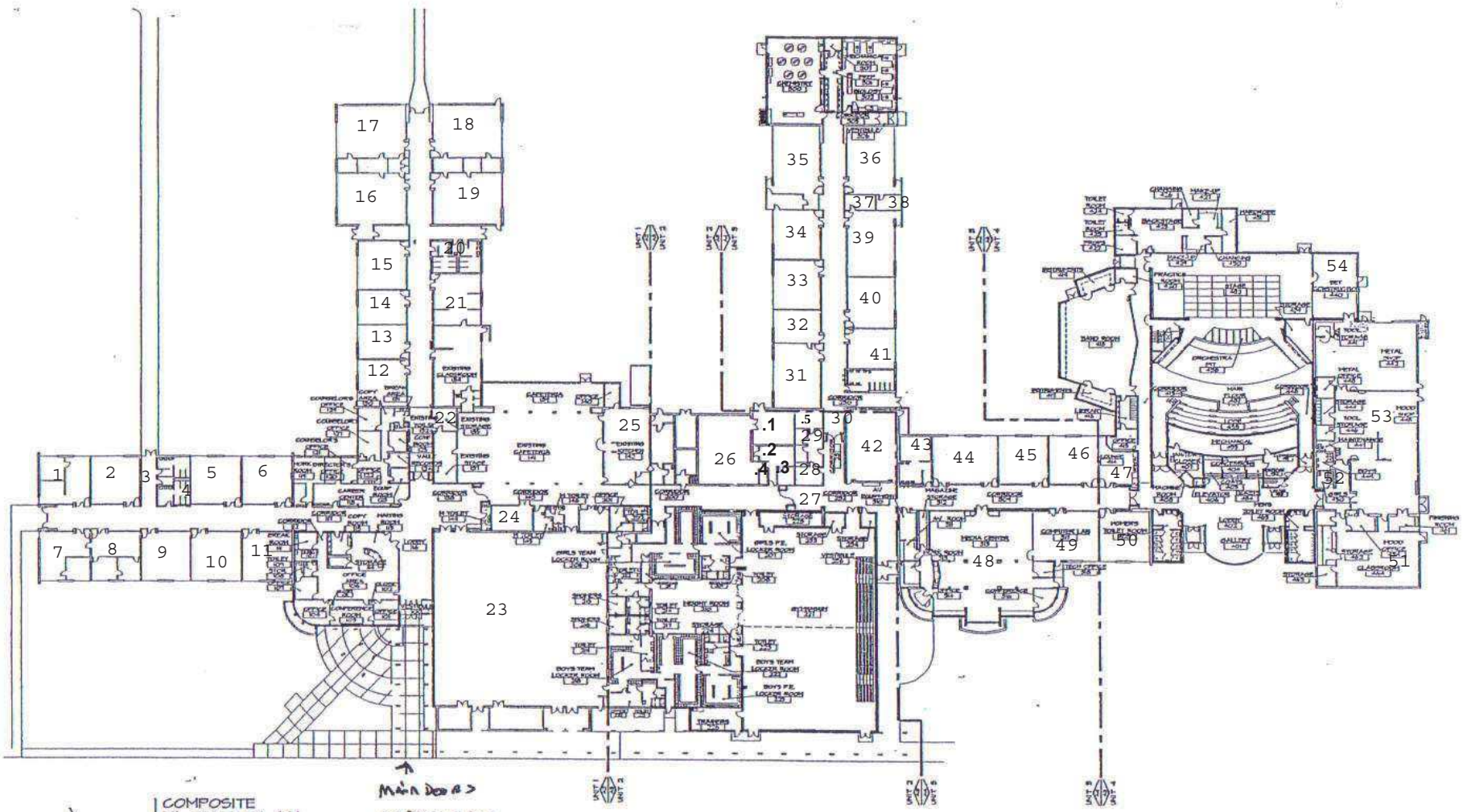
LEA: Bullock Creek Schools
Building: Bullock Creek High School
Building No.: 1
Address: 1420 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
48	22	Floor Tile & Mastic - 9 inch	2700	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
49	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
50	22	Floor Tile & Mastic - 9 inch	900	Sq.Ft.		maintain with O&M plan. (7)
51	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	20	Ln.Ft.		maintain with O&M plan. (7)
51	22	Floor Tile & Mastic - 9 inch	1400	Sq.Ft.		maintain with O&M plan. (7)
52	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	9	Ln.Ft.		maintain with O&M plan. (7)
53	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	120	Ln.Ft.		maintain with O&M plan. (7)
54	2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	47	Ln.Ft.		maintain with O&M plan. (7)
55	22	Floor Tile & Mastic - 9 inch	200	Sq.Ft.		maintain with O&M plan. (7)
Building Wide	34	Caulk - On Exterior Steel Door Frame	0	Each	Removed in 2013	()

Floor Plan



THA
ARCHITECTS
ENGINEERS

BULLOCK CREEK HIGH SCHOOL

BULLOCK CREEK SCHOOL DISTRICT

Photos



Room 23 (Gym Balcony)

Bullock Creek Middle School

Material Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Bullock Creek High School
Address: 1420 South Badour Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
2	Pipe Insulation-Mudded Fitting - On Fiberglass Line	Thermal	Yes	Yes	Yes	10%	Chrysotile	1239	Ln.Ft.
3	Pipe Insulation-Mudded Roof Drain -	Thermal	Yes	Yes	Yes	---	Assumed	6	Ln.Ft.
22	Floor Tile & Mastic - 9 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	27420	Sq.Ft.
30	Laboratory Counter Top -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	6	Sq.Ft.
31	Texture - Popcorn Paint	Surfacing	Yes	Yes	Yes	---	Assumed	1600	Sq.Ft.
32	Tar, Felt & Associated Mastic Layers Under Wood Floor -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	8100	Sq.Ft.
33	Boiler Insulation -	Thermal	Yes	Yes	Yes	---	Assumed	0	Sq.Ft.
34	Caulk - On Exterior Steel Door Frame	Misc.	Category II Non-Friable	No	Yes	3%	Chrysotile	0	Each
35	Window Glazing - In Steel Door Frame	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.

** Non-Friable materials may become friable when damaged.*
*** May become regulated asbestos containing material (RACM) when damaged.*

Misc. = miscelleaneous material
Surfacing = surfacing material
Thermal = thermal system insulation
RACM = regulated asbestos containing material

Response Action Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek Middle School
Building No.: 2
Address: 644 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
01	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
02	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
03	2	Floor Tile & Mastic -	900	Sq.Ft.	Assumed Under Vinyl Flooring	maintain with O&M plan. (7)
04	2	Floor Tile & Mastic -	900	Sq.Ft.	Assumed Under Vinyl Flooring	maintain with O&M plan. (7)
05	5	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
06	2	Floor Tile & Mastic -	900	Sq.Ft.	Assumed Under Vinyl Flooring	maintain with O&M plan. (7)
07	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
08	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
09	2	Floor Tile & Mastic -	900	Sq.Ft.		maintain with O&M plan. (7)
10	2	Floor Tile & Mastic -	900	Sq.Ft.		maintain with O&M plan. (7)
11	2	Floor Tile & Mastic -	1000	Sq.Ft.		maintain with O&M plan. (7)
12	2	Floor Tile & Mastic -	1000	Sq.Ft.		maintain with O&M plan. (7)
13	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
14	2	Floor Tile & Mastic -	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
14	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
14	12	Window Glazing - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek Middle School
Building No.: 2
Address: 644 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
15	2	Floor Tile & Mastic -	550	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
16	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
17	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
17	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
17	12	Window Glazing - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
18	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
19	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
20	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
20	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
20	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
21	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
21	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
21	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
22	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
23	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()
24	2	Floor Tile & Mastic -	0	Sq.Ft.	Removed Prior to Re-Inspection	()

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek Middle School
Building No.: 2
Address: 644 South Badour Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
24	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
24	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
25	2	Floor Tile & Mastic -	800	Sq.Ft.		maintain with O&M plan. (7)
26	2	Floor Tile & Mastic -	2	Sq.Ft.		maintain with O&M plan. (7)
26	2	Floor Tile & Mastic -	1200	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
26	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
26	12	Window Glazing - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
27	2	Floor Tile & Mastic -	200	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
28	2	Floor Tile & Mastic -	80	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
29	13	Drywall - w/ Texture Ceiling	219	Sq.Ft.		maintain with O&M plan. (7)
29	14	Pipe Insulation-Mudded Fitting - On Fiberglass Line	45	Ln.Ft.	Above Hard Lid Ceiling	maintain with O&M plan. (7)
30	13	Drywall - w/ Texture Ceiling	219	Sq.Ft.		maintain with O&M plan. (7)
30	14	Pipe Insulation-Mudded Fitting - On Fiberglass Line	45	Ln.Ft.	Above Hard Lid Ceiling	maintain with O&M plan. (7)
31	2	Floor Tile & Mastic -	600	Sq.Ft.		maintain with O&M plan. (7)
31	11	Caulk - On Exterior Metal Door Frame	2	Sq.Ft.		maintain with O&M plan. (7)
31	12	Window Glazing - On Exterior Metal Door Frame	2	Sq.Ft.		maintain with O&M plan. (7)

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
32	2	Floor Tile & Mastic -	800	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
33	2	Floor Tile & Mastic -	600	Sq.Ft.		maintain with O&M plan. (7)
33	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed in 2013	()
34	2	Floor Tile & Mastic -	3600	Sq.Ft.		maintain with O&M plan. (7)
34	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
34	12	Window Glazing - On Exterior Metal Door Frame	0	Sq.Ft.	Removed Prior to Re-Inspection	()
35	5	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
36	2	Floor Tile & Mastic -	100	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
37	2	Floor Tile & Mastic -	300	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
38	2	Floor Tile & Mastic -	3600	Sq.Ft.	Assumed Under Wood Floor (Mat. #6)	maintain with O&M plan. (7)
38	6	Tar, Felt & Associated Mastic Layers Under Wood Floor - Woolfelt	3600	Sq.Ft.		maintain with O&M plan. (7)
38	7	Transite Panels -	80	Sq.Ft.		maintain with O&M plan. (7)
38	10	Pipe Insulation-Mudded Fitting - Roof Drains	4	Ln.Ft.		maintain with O&M plan. (7)
38	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed in 2013	()
39	2	Floor Tile & Mastic -	200	Sq.Ft.		maintain with O&M plan. (7)
39	8	Pipe Insulation-Mudded Fitting - and Elbows	3	Ln.Ft.		maintain with O&M plan. (7)

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
41	2	Floor Tile & Mastic -	180	Sq.Ft.		maintain with O&M plan. (7)
42	7	Transite Panels -	84	Sq.Ft.		maintain with O&M plan. (7)
42	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
42	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
43	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
43	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
44	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
44	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
45	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
45	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
46	11	Caulk - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
46	12	Window Glazing - On Exterior Metal Door Frame	1	Sq.Ft.		maintain with O&M plan. (7)
Hall 2	11	Caulk - On Exterior Metal Door Frame	2	Sq.Ft.		maintain with O&M plan. (7)
Hall 2	12	Window Glazing - On Exterior Metal Door Frame	2	Sq.Ft.		maintain with O&M plan. (7)
Hall 3	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed in 2013	()
Hall 4	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed in 2013	()

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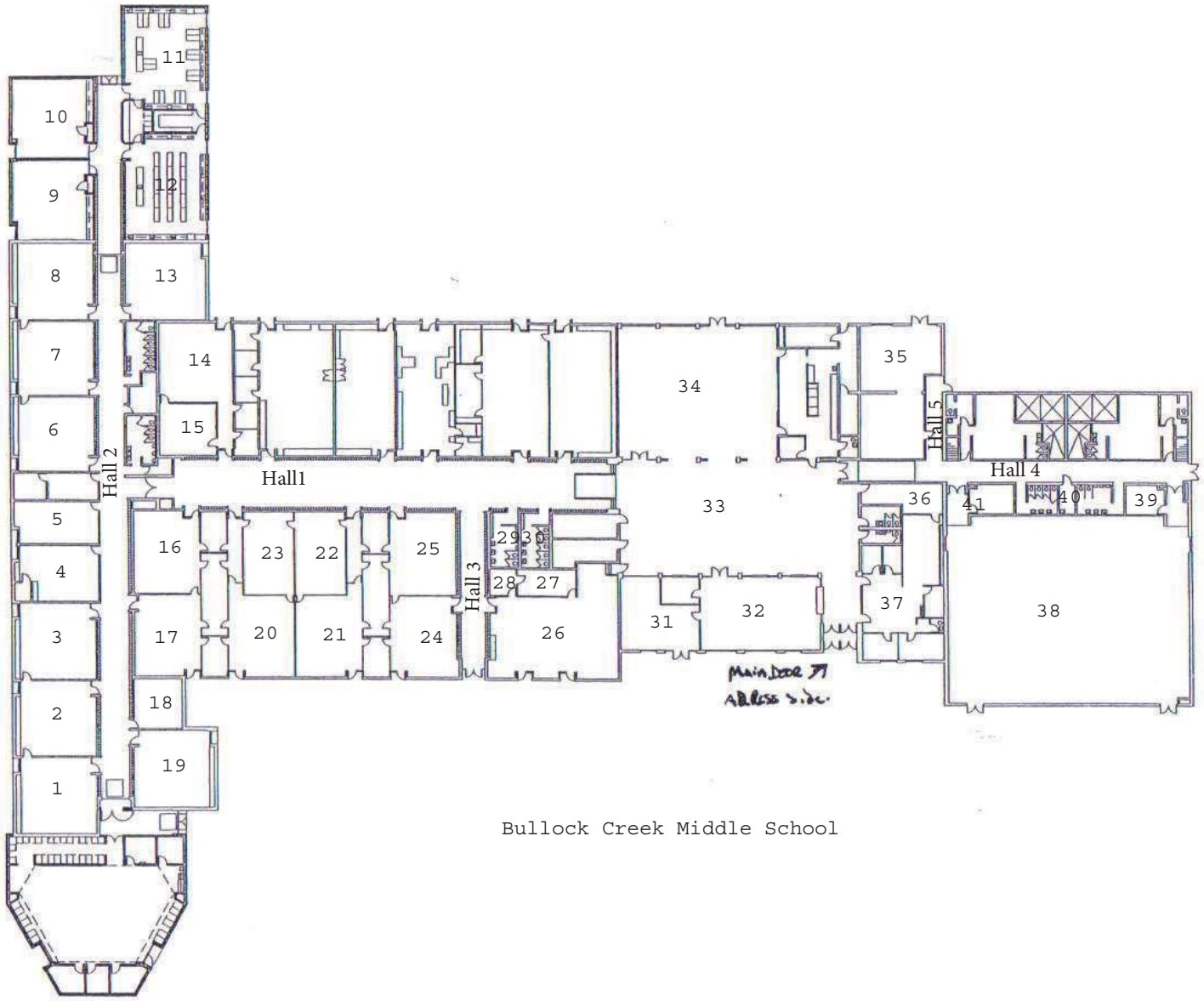
LEA: Bullock Creek Schools
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Midland, MI 48640

Response Action Report

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
Hall 5	11	Caulk - On Exterior Metal Door Frame	0	Sq.Ft.	Removed in 2013	()

Floor Plan



Bullock Creek Middle School

Bullock Creek Elementary School

Material Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Bullock Creek Elementary School
Address: 1037 Poseyville Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
1	Tank Insulation - Water Tank	Thermal	Yes	Yes	Yes	---	Assumed	0	Sq.Ft.
2	Pipe Insulation-Mudded Fitting - On Fiberglass Runs	Thermal	Yes	Yes	Yes	---	Assumed	0	Ln.Ft.
5	Pipe Insulation - Aircell	Thermal	Yes	Yes	Yes	---	Assumed	0	Ln.Ft.
6	Fire Brick -	Thermal	No	No	No	---	None Detected	120	Sq.Ft.
7	Ceiling Tile - 12 inch, Glued on	Misc.	Yes	Yes	Yes	---	Assumed	9140	Sq.Ft.
8	Floor Tile & Mastic - 9 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	11480	Sq.Ft.
14	Fire Rated Door -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	6	Each
15	Concrete Block -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	240	Sq.Ft.
16	Glue - Behind 12 inch Ceiling Tile	Misc.	Category II Non-Friable	No	Yes	---	Assumed	10420	Sq.Ft.
17	Vibration Dampener Cloth -	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	9300	Sq.Ft.
19	Floor Tile & Mastic - 12 Inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	16300	Sq.Ft.
20	Caulk - Hard Grey and White, Inside Boiler	Misc.	No	No	Yes	< 0.25%	Chrysotile	0	Each
21	Duct Work Insulation - Seam Tape - White	Thermal	Yes	Yes	Yes	50%	Chrysotile	0	Sq.Ft.
22	Gasket - Black Hard	Misc.	No	No	Yes	< 0.25%	Chrysotile	0	Ln.Ft.

** Non-Friable materials may become friable when damaged.*
*** May become regulated asbestos containing material (RACM) when damaged.*

Misc. = miscelleaneous material
Surfacing = surfacing material
Thermal = thermal system insulation
RACM = regulated asbestos containing material

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Bullock Creek Elementary School
Address: 1037 Poseyville Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
23	Window Glazing - Hard, White on Exterior Wood Window Frame	Misc.	Category II Non-Friable	No	Yes	---	Assumed	146	Sq.Ft.
24	Caulk - Soft, Light Grey on Exterior Wood Windows	Misc.	Category II Non-Friable	No	Yes	---	Assumed	37	Sq.Ft.
25	Caulk - Soft, Tan Behind Material 24 on Wood Window Frame	Misc.	Category II Non-Friable	No	Yes	---	Assumed	37	Sq.Ft.
26	Caulk - Hard, Tan Behind Material 24 on Wood Window Frame	Misc.	Category II Non-Friable	No	Yes	---	Assumed	37	Sq.Ft.
27	Floor Tile & Mastic - 12 inch, Salmon w/ Tan Specks, Orange Mastic	Misc.	No	No	No	---	None Detected	1000	Sq.Ft.
28	Glue - Tan Contact Glue Behind White Beadboard	Misc.	No	No	No	---	None Detected	600	Sq.Ft.
29	Caulk - Grey, On Exterior Steel Door Frame	Misc.	Category II Non-Friable	No	Yes	5%	Chrysotile	0	Each
30	Brick & Mortar - Exterior Red Brick, Grey Mortar	Misc.	No	No	No	---	None Detected	60000	Sq.Ft.
31	Floor Tile & Mastic - 9 inch Tan, Black Mastic	Misc.	Category I Non-Friable	No	Yes	T-12% M-10%	Chrysotile	120	Sq.Ft.
32	Ceiling Tile - 12 inch, Splined, Gouges and Pits	Misc.	Yes	No	No	---	None Detected	120	Sq.Ft.

** Non-Friable materials may become friable when damaged.*
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Misc. = miscelleaneous material
Surfacing = surfacing material
Thermal = thermal system insulation
RACM = regulated asbestos containing material

Response Action Report

Northern Analytical Services
14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Bullock Creek Elementary School
Building No.: 3
Address: 1037 Poseyville Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
01	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
01	16	Glue - Behind 12 inch Ceiling Tile	580	Sq.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)
02	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
03	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
03	14	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
04	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
05	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
06	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
07	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
08	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
09	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
10	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
11	8	Floor Tile & Mastic - 9 inch	780	Sq.Ft.		maintain with O&M plan. (7)
12	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
13	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
14	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)

Northern Analytical Services

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LEA: Bullock Creek Schools
Building: Bullock Creek Elementary School
Building No.: 3
Address: 1037 Poseyville Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
15	16	Glue - Behind 12 inch Ceiling Tile	580	Sq.Ft.		maintain with O&M plan. (7)
15	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
16	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
17	8	Floor Tile & Mastic - 9 inch	180	Sq.Ft.		maintain with O&M plan. (7)
18	19	Floor Tile & Mastic - 12 Inch	1000	Sq.Ft.		maintain with O&M plan. (7)
20	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
21	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
22	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
23	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
24	19	Floor Tile & Mastic - 12 Inch	780	Sq.Ft.		maintain with O&M plan. (7)
25	8	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
25	16	Glue - Behind 12 inch Ceiling Tile	0	Sq.Ft.	Removed	()
26	7	Ceiling Tile - 12 inch, Glued on	580	Sq.Ft.	Assumed Above Ceiling, 25 sq.ft. Exposed	maintain with O&M plan. (7)
26	8	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
26	16	Glue - Behind 12 inch Ceiling Tile	580	Sq.Ft.	Assumed Above Ceiling, 25 sq.ft. Exposed	maintain with O&M plan. (7)
27	7	Ceiling Tile - 12 inch, Glued on	580	Sq.Ft.		maintain with O&M plan. (7)

Northern Analytical Services

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Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
27	8	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
27	16	Glue - Behind 12 inch Ceiling Tile	580	Sq.Ft.		maintain with O&M plan. (7)
28	7	Ceiling Tile - 12 inch, Glued on	1820	Sq.Ft.	Water Spots, Remains Intact	maintain with O&M plan. (7)
28	8	Floor Tile & Mastic - 9 inch	1820	Sq.Ft.	Assumed Under Wood Floor	maintain with O&M plan. (7)
28	16	Glue - Behind 12 inch Ceiling Tile	1820	Sq.Ft.		maintain with O&M plan. (7)
28.1	16	Glue - Behind 12 inch Ceiling Tile	120	Sq.Ft.		maintain with O&M plan. (7)
29	7	Ceiling Tile - 12 inch, Glued on	6000	Sq.Ft.		maintain with O&M plan. (7)
29	16	Glue - Behind 12 inch Ceiling Tile	6000	Sq.Ft.		maintain with O&M plan. (7)
29	18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	6000	Sq.Ft.		maintain with O&M plan. (7)
29.1	7	Ceiling Tile - 12 inch, Glued on	160	Sq.Ft.		maintain with O&M plan. (7)
29.1	16	Glue - Behind 12 inch Ceiling Tile	160	Sq.Ft.		maintain with O&M plan. (7)
30	8	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
31	8	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed	()
31.1	2	Pipe Insulation-Mudded Fitting - On Fiberglass Runs	0	Ln.Ft.	Abated May 2020	(4)
32	2	Pipe Insulation-Mudded Fitting - On Fiberglass Runs	0	Ln.Ft.	Abated May 2020	(4)
32	5	Pipe Insulation - Aircell	0	Ln.Ft.	Abated May 2020	(4)

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Response Action Report

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
32	15	Concrete Block -	240	Sq.Ft.	Chimney	maintain with O&M plan. (7)
32	20	Caulk - Hard Grey and White, Inside Boiler	0	Each	Inside Furnace, Abated	()
32	21	Duct Work Insulation - Seam Tape - White	0	Sq.Ft.	Abated	(4)
32	22	Gasket - Black Hard	0	Ln.Ft.	Abated	()
33	2	Pipe Insulation-Mudded Fitting - On Fiberglass Runs	0	Ln.Ft.	Abated May 2020	(4)
34	8	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
35	14	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
35	20	Caulk - Hard Grey and White, Inside Boiler	0	Each	Inside Furnace, Abated	()
36	14	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
36	18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	900	Sq.Ft.	Assumed Under 12x12 Floor Tile	maintain with O&M plan. (7)
36	29	Caulk - Grey, On Exterior Steel Door Frame	0	Each	Exterior Door, Removed	()
36.1	31	Floor Tile & Mastic - 9 inch Tan, Black Mastic	120	Sq.Ft.		maintain with O&M plan. (7)
37	18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	900	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
38	14	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
38	18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	900	Sq.Ft.	Under Carpet	maintain with O&M plan. (7)
39	14	Fire Rated Door -	2	Each		maintain with O&M plan. (7)

Northern Analytical Services

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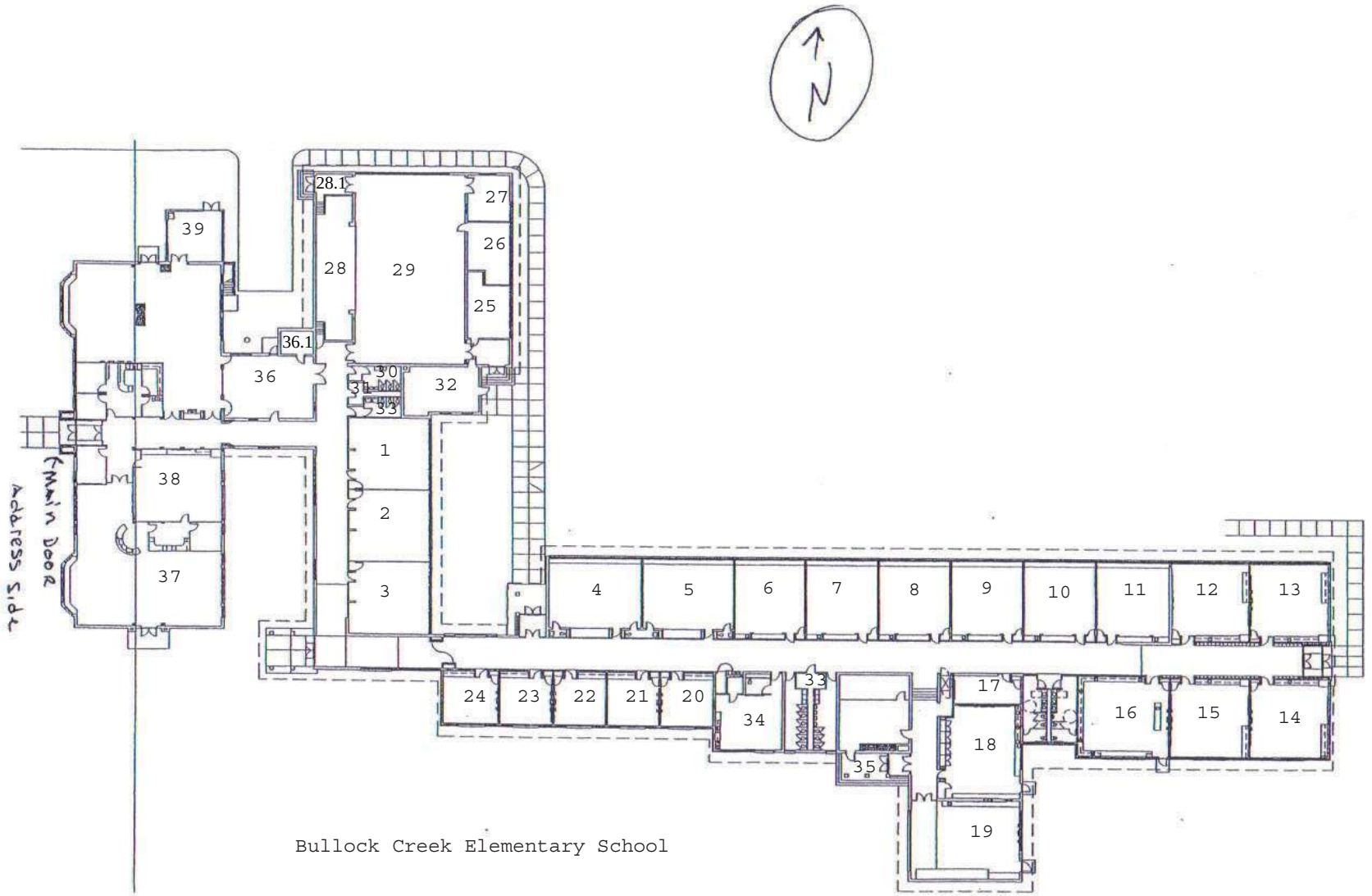
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Building: Bullock Creek Elementary School
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Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
39	18	Tar, Felt & Associated Mastic Layers Under Wood Floor -	600	Sq.Ft.	Under 12x12 Floor Tile	maintain with O&M plan. (7)
39	19	Floor Tile & Mastic - 12 Inch	600	Sq.Ft.		maintain with O&M plan. (7)
Exterior	23	Window Glazing - Hard, White on Exterior Wood Window Frame	146	Sq.Ft.	See Drawing and Pictures	remove or repair damage ASAP. (4)
Exterior	24	Caulk - Soft, Light Grey on Exterior Wood Windows	37	Sq.Ft.	See Drawing and Pictures	maintain with O&M plan. (7)
Exterior	25	Caulk - Soft, Tan Behind Material 24 on Wood Window Frame	37	Sq.Ft.	See Drawing and Pictures	maintain with O&M plan. (7)
Exterior	26	Caulk - Hard, Tan Behind Material 24 on Wood Window Frame	37	Sq.Ft.	See Drawing and Pictures	maintain with O&M plan. (7)
Hall 1	19	Floor Tile & Mastic - 12 Inch	4200	Sq.Ft.		maintain with O&M plan. (7)
Hall 2	19	Floor Tile & Mastic - 12 Inch	1800	Sq.Ft.		maintain with O&M plan. (7)
Hall 3	19	Floor Tile & Mastic - 12 Inch	900	Sq.Ft.		maintain with O&M plan. (7)

Floor Plan



Bullock Creek Elementary School

Floyd Elementary School

Material Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Floyd Elementary School
Address: 725 South 8 Mile Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	Thermal	Yes	Yes	Yes	60%	Chrysotile	66	Ln.Ft.
6	Fire Rated Door -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	1	Each
7	Floor Tile & Mastic - 9 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	3092	Sq.Ft.
8	Floor Tile & Mastic - 12 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	4890	Sq.Ft.
9	Pipe Insulation - Woolfelt	Thermal	Yes	Yes	Yes	---	Assumed	330	Ln.Ft.
10	Transite Panels -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	0	Sq.Ft.
11	Floor Tile & Mastic - 9 inch Light Gray w/ Orange, White, and Brown Streaks	Misc.	Category I Non-Friable	No	Yes	T-4% M-3%	Chrysotile	0	Sq.Ft.
12	Ceiling Tile - 2x2 Fiberglass Ceiling Tile w/ Textured Surface	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
13	Cove Base - w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
14	Window Glazing - on Metal Window Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
15	Caulk - On Exterior Metal Window/Door Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
16	Drywall -	Misc.	No	No	No		None Detected	0	Sq.Ft.
17	Plaster -	Surfacing	No	No	No		None Detected	0	Sq.Ft.
18	Window Glazing - On Interior Wood Window Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
19	Cove Base - Brown w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.

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Surfacing = surfacing material
Thermal = thermal system insulation
RACM = regulated asbestos containing material

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

Customer: Bullock Creek Schools
Building: Floyd Elementary School
Address: 725 South 8 Mile Road
Midland, MI 48640

Printed: October 4, 2024

Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
20	Sink Undercoating - Gray	Surfacing	Category II Non-Friable	No	Yes	5%	Chrysotile	0	Sq.Ft.
21	Glue Assumed Behind Visual Display/Mirrors -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	0	Sq.FT.
22	Ceiling Tile - 2x2 ceiling tile w/ white w/ random gouges	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
24	Cove Base - Light Green w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
25	Cove Base - Gray w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
26	Ceiling Tile - 2x2 Ceiling Tile w/ White Horizontal Gouges	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
27	Floor Tile & Mastic - 12 inch w/ White w/ Brown Blotches	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
28	Caulk - On Interior Metal Door Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.

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Response Action Report

Northern Analytical Services
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LEA: Bullock Creek Schools
Building: Floyd Elementary School
Building No.: 4
Address: 725 South 8 Mile Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
01	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed in 2013	(4)
01	6	Fire Rated Door -	0	Each	Removed in 2013	()
01	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
01	10	Transite Panels -	0	Sq.Ft.	Removed in 2013	()
01	20	Sink Undercoating - Gray	0	Sq.Ft.	Removed in 2013	()
01	21	Glue Assumed Behind Visual Display/Mirrors -	0	Sq.FT.	Removed in 2013	()
02.1	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
02.2	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed in 2013	(4)
02.2	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
03	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed in 2013	(4)
03	6	Fire Rated Door -	0	Each	Removed in 2013	()
03	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
03.1	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed in 2013	(4)
03.1	20	Sink Undercoating - Gray	0	Sq.Ft.	Removed in 2013	()
03.2	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed in 2013	(4)
03.2	6	Fire Rated Door -	0	Each	Removed in 2013	()

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
03.2	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed in 2013	()
03.2	10	Transite Panels -	0	Sq.Ft.	Removed in 2013	()
03A	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed 2013	()
03A	10	Transite Panels -	0	Sq.Ft.	Removed 2013	()
03B	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed 2013	()
03B	10	Transite Panels -	0	Sq.Ft.	Removed 2013	()
04	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed 2013	(4)
04	6	Fire Rated Door -	0	Each	Removed 2013	()
04	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Removed 2013	()
04	10	Transite Panels -	0	Sq.Ft.	Removed 2013	()
05	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	60	Ln.Ft.	Assumed Above Ceiling Tile	maintain with O&M plan. (7)
06	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Abated June 2020	()
07	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()
08	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()
09	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()
10	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()

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Response Action Report

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
11	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()
12	7	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated June 2020	()
13	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
14	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
15	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
16	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
17	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
18	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
19	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
20	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
21	7	Floor Tile & Mastic - 9 inch	800	Sq.Ft.	Stage Area	maintain with O&M plan. (7)
21	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed in 2013	maintain with O&M plan. (7)
22	6	Fire Rated Door -	1	Each		maintain with O&M plan. (7)
23	8	Floor Tile & Mastic - 12 inch	900	Sq.Ft.		maintain with O&M plan. (7)
24	8	Floor Tile & Mastic - 12 inch	900	Sq.Ft.		maintain with O&M plan. (7)
25	8	Floor Tile & Mastic - 12 inch	900	Sq.Ft.		maintain with O&M plan. (7)

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
26	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
27	8	Floor Tile & Mastic - 12 inch	0	Sq.Ft.	Removed Prior to Re-Inspection	()
28	8	Floor Tile & Mastic - 12 inch	900	Sq.Ft.		maintain with O&M plan. (7)
29	9	Pipe Insulation - Woolfelt	110	Ln.Ft.		maintain with O&M plan. (7)
31	8	Floor Tile & Mastic - 12 inch	195	Sq.Ft.		maintain with O&M plan. (7)
31	9	Pipe Insulation - Woolfelt	60	Ln.Ft.		maintain with O&M plan. (7)
32	8	Floor Tile & Mastic - 12 inch	195	Sq.Ft.		maintain with O&M plan. (7)
32	9	Pipe Insulation - Woolfelt	80	Ln.Ft.	1 Fitting by Door Above Sink	remove or repair damage ASAP. (4)
33	8	Floor Tile & Mastic - 12 inch	600	Sq.Ft.		maintain with O&M plan. (7)
34	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	6	Ln.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)
34	8	Floor Tile & Mastic - 12 inch	300	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
34	9	Pipe Insulation - Woolfelt	80	Ln.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)
35	7	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
36	7	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
37	7	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
Exterior Soffit	10	Transite Panels -	0	Sq.Ft.	Removed in 2017	()

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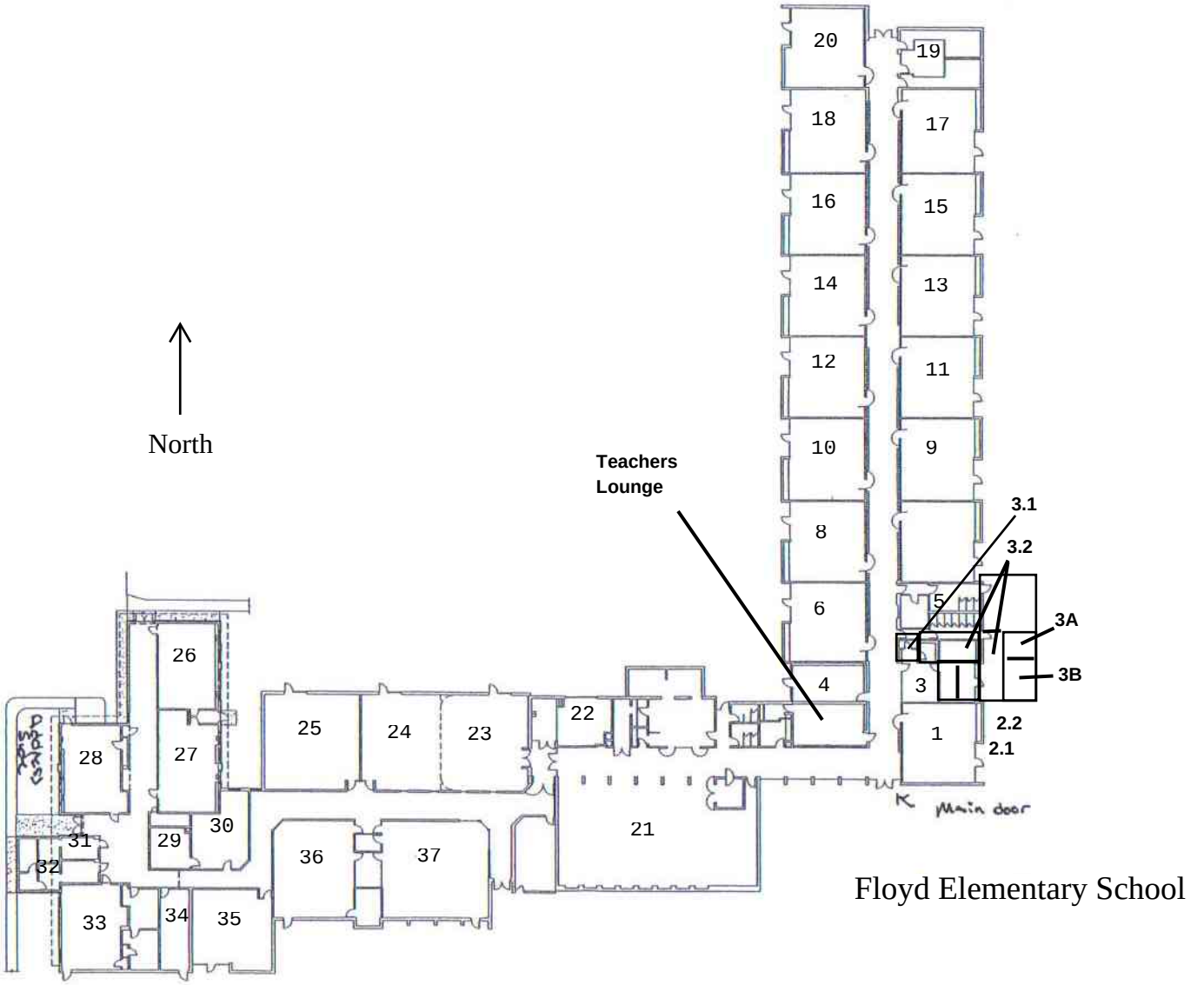
LEA: Bullock Creek Schools
Building: Floyd Elementary School
Building No.: 4
Address: 725 South 8 Mile Road
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
Teachers Lounge	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	0	Ln.Ft.	Removed 2013	(4)
Teachers Lounge	6	Fire Rated Door -	0	Each	Removed 2013	()
Teachers Lounge	11	Floor Tile & Mastic - 9 inch Light Gray w/ Orange, White, and Brown Streaks	0	Sq.Ft.	Removed 2013	()
Teachers Lounge	20	Sink Undercoating - Gray	0	Sq.Ft.	Removed in 2013	()

Floor Plan



Floyd Elementary School

Pine River Elementary School

Material Report

Northern Analytical Services

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Customer: Bullock Creek Schools
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Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows on Fiberglass Runs	Thermal	Yes	Yes	Yes	60%	Chrysotile	66	Ln.Ft.
6	Fire Rated Door -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	1	Each
7	Floor Tile & Mastic - 9 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	3092	Sq.Ft.
8	Floor Tile & Mastic - 12 inch	Misc.	Category I Non-Friable	No	Yes	---	Assumed	4890	Sq.Ft.
9	Pipe Insulation - Woolfelt	Thermal	Yes	Yes	Yes	---	Assumed	330	Ln.Ft.
10	Transite Panels -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	0	Sq.Ft.
11	Floor Tile & Mastic - 9 inch Light Gray w/ Orange, White, and Brown Streaks	Misc.	Category I Non-Friable	No	Yes	T-4% M-3%	Chrysotile	0	Sq.Ft.
12	Ceiling Tile - 2x2 Fiberglass Ceiling Tile w/ Textured Surface	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
13	Cove Base - w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
14	Window Glazing - on Metal Window Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
15	Caulk - On Exterior Metal Window/Door Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
16	Drywall -	Misc.	No	No	No		None Detected	0	Sq.Ft.
17	Plaster -	Surfacing	No	No	No		None Detected	0	Sq.Ft.
18	Window Glazing - On Interior Wood Window Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
19	Cove Base - Brown w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.

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Material Report

Material Number	*Homogeneous Material Description*	*Category*	*Friability**	*RACM***	*Asbestos Detected*	*Percent Asbestos*	*Asbestos Type*	*Quantity*	*Units*
20	Sink Undercoating - Gray	Surfacing	Category II Non-Friable	No	Yes	5%	Chrysotile	0	Sq.Ft.
21	Glue Assumed Behind Visual Display/Mirrors -	Misc.	Category II Non-Friable	No	Yes	---	Assumed	0	Sq.FT.
22	Ceiling Tile - 2x2 ceiling tile w/ white w/ random gouges	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
24	Cove Base - Light Green w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
25	Cove Base - Gray w/ Glue Backing	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
26	Ceiling Tile - 2x2 Ceiling Tile w/ White Horizontal Gouges	Misc.	Yes	No	No	---	None Detected	0	Sq.Ft.
27	Floor Tile & Mastic - 12 inch w/ White w/ Brown Blotches	Misc.	No	No	No	---	None Detected	0	Sq.Ft.
28	Caulk - On Interior Metal Door Frame	Misc.	No	No	No	---	None Detected	0	Sq.Ft.

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Response Action Report

Northern Analytical Services

14870 225th Avenue, Big Rapids, MI 49307 - (231) 268-0004 - Fax (866) 214-4739

LEA: Bullock Creek Schools
Building: Pine River Elementary School
Building No.: 5
Address: 1894 East Pine River
Midland, MI 48640

Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
01	6	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
01	11	Glued on Ceiling Tile - 12 inch	900	Sq.Ft.	Assumed Above Drop Ceiling	maintain with O&M plan. (7)
02	6	Floor Tile & Mastic - 9 inch	200	Sq.Ft.	Assumed Under 12x12 Floor Tile	maintain with O&M plan. (7)
03	6	Floor Tile & Mastic - 9 inch	900	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
04	6	Floor Tile & Mastic - 9 inch	1400	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
04	17	Floor Tile & Mastic - 12 inch, Black Mastic	400	Sq.Ft.	Along West End of Room	maintain with O&M plan. (7)
05	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows	15	Ln.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)
06	2	Pipe Insulation-Mudded Fitting - On Fittings and Elbows	15	Ln.Ft.	Above Ceiling Tile	maintain with O&M plan. (7)
07	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
08	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
09	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
10	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
11	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
12	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()
12	11	Glued on Ceiling Tile - 12 inch	900	Sq.Ft.	Assumed Above Drop Ceiling	maintain with O&M plan. (7)
13	6	Floor Tile & Mastic - 9 inch	0	Sq.Ft.	Abated Summer 2023	()

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Response Action Report

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Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
14	13	Floor Tile & Mastic - 9 inch, White w/ Brown Streaks	0	Sq.Ft.	Stage, Abated Summer 2023	()
14	14	Floor Tile & Mastic - 9 inch, Brown w/ White Streaks	0	Sq.Ft.	Abated in 2013	()
15	11	Glued on Ceiling Tile - 12 inch	100	Sq.Ft.		maintain with O&M plan. (7)
16	6	Floor Tile & Mastic - 9 inch	180	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
17	6	Floor Tile & Mastic - 9 inch	100	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
18	6	Floor Tile & Mastic - 9 inch	100	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
19	6	Floor Tile & Mastic - 9 inch	300	Sq.Ft.	Assumed Under Carpet	maintain with O&M plan. (7)
20	17	Floor Tile & Mastic - 12 inch, Black Mastic	1100	Sq.Ft.		maintain with O&M plan. (7)
21	17	Floor Tile & Mastic - 12 inch, Black Mastic	900	Sq.Ft.		maintain with O&M plan. (7)
22	17	Floor Tile & Mastic - 12 inch, Black Mastic	900	Sq.Ft.		maintain with O&M plan. (7)
23	11	Glued on Ceiling Tile - 12 inch	300	Sq.Ft.		maintain with O&M plan. (7)
23	13	Floor Tile & Mastic - 9 inch, White w/ Brown Streaks	114	Sq.Ft.		maintain with O&M plan. (7)
24	6	Floor Tile & Mastic - 9 inch	80	Sq.Ft.		maintain with O&M plan. (7)
24	11	Glued on Ceiling Tile - 12 inch	80	Sq.Ft.		maintain with O&M plan. (7)
25	20	Ceramic Tile & Grout - Room 25, Floor w/ Black Mastic	0	Sq.Ft.	Abated Summer 2023	()
28	20	Ceramic Tile & Grout - Room 25, Floor w/ Black Mastic	0	Sq.Ft.	Abated Summer 2023	()

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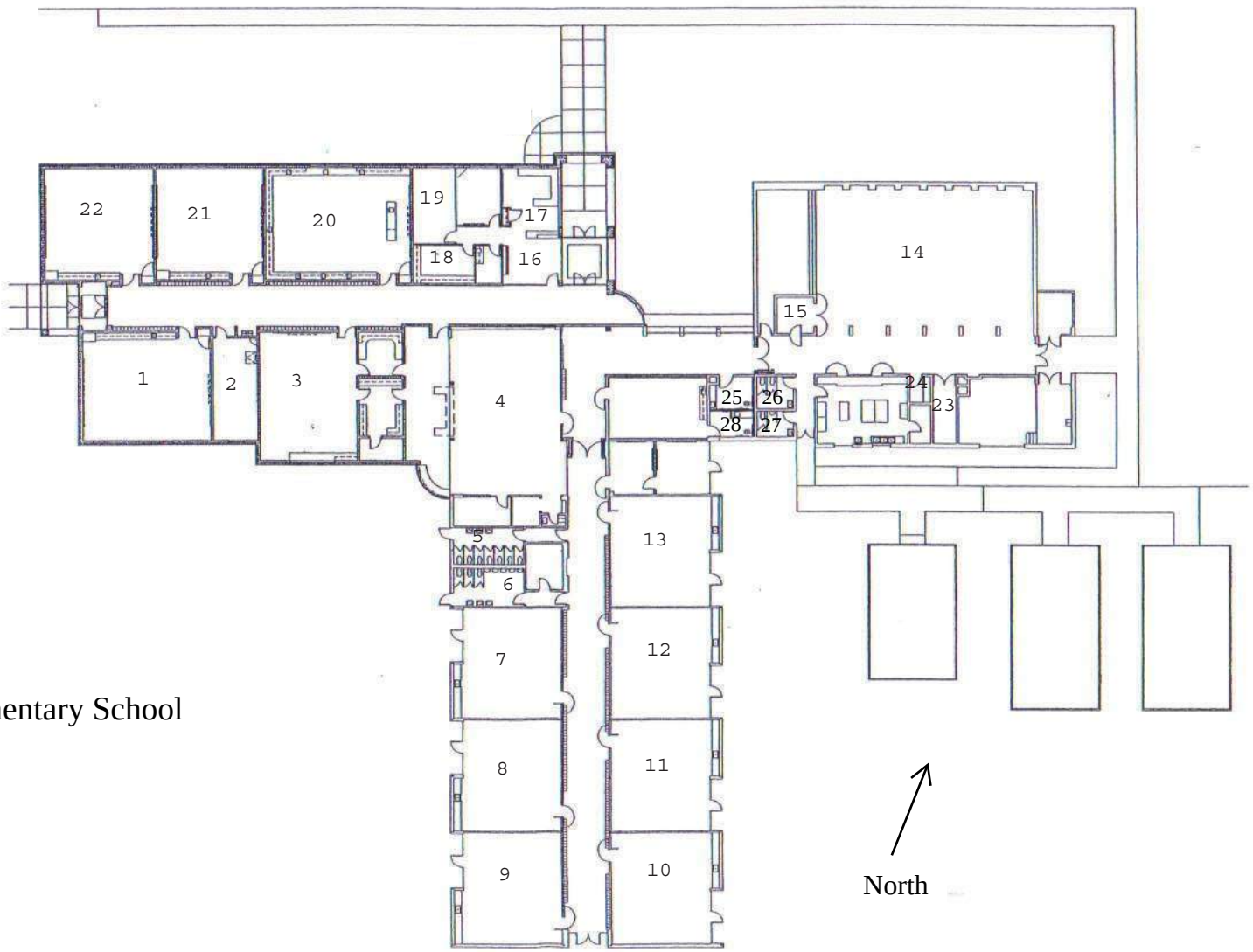
Response Action Report

Printed: October 4, 2024

Room Number	*Material Number*	*Homogeneous Material Description*	*Quantity*	*Units*	*Comments*	*Response Action (AHERA Ranking)*
Exterior	12	Transite Panels -	2840	Sq.Ft.		maintain with O&M plan. (7)

Floor Plan

Pine River Elementary School



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. The contractor's staff responsible for demolition shall be experienced in this type of work. Equipment is to be of suitable type, in good working conditions, 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 number 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

Architects Engineers
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Ph: 810-767-5600 | THA-Flint.com

Specification Manual

Bullock Creek School District
2023 Bond Series 2 –
2027 Improvements

Project 'A'
Renovations to Bullock Creek High School
1420 South Badour Road, Midland, MI 48640

Project 'B'
Renovations to Bullock Creek Middle School
644 South Badour Road, Midland, MI 48640

Project 'C'
Renovations to Bullock Creek Elementary School
1037 S. Poseyville Road, Midland, MI 48640

Project 'D'
Addition and Renovations to Floyd Elementary School
725 South Eight Mile Road, Midland, MI 48640

Project 'E'
Addition and Renovations to Pine River Elementary School
1894 Pine River Road, Midland, MI 48640

FOR: BULLOCK CREEK SCHOOL DISTRICT
1420 South Badour Road, Midland MI 48640

THA PROJECT No: 26-210

SECTION 00 01 01

PROJECT MANUAL

PROJECT NO:	**26-210**
PROJECTS:	**2023 BOND – SERIES 2 2027 IMPROVEMENTS** **PROJECT A: RENOVATIONS TO BULLOCK CREEK HIGH SCHOOL** 1420 SOUTH BADOUR ROAD, MIDLAND, MICHIGAN 48640 - TOILET ROOM REMODELING - KITCHEN HOOD & MAKE-UP AIR UNIT REPLACEMENT - DISCUS CAGE REPLACEMENT **PROJECT B: RENOVATIONS TO BULLOCK CREEK MIDDLE SCHOOL** 644 SOUTH BADOUR ROAD, MIDLAND, MICHIGAN 48640 - LOCKER ROOM REMODEL - CLASSROOM AND GYMNASIUM PAINTING - BOILER & MECHANICAL UNIT REPLACEMENTS - CEILING & LIGHTING REPLACEMENT - ELECTRICAL TRANSFORMER REPLACEMENT **PROJECT C: RENOVATIONS TO: BULLOCK CREEK ELEMENTARY SCHOOL** 1037 SOUTH POSEYVILLE ROAD, MIDLAND, MICHIGAN 48640 - DOOR REPLACEMENT **PROJECT D: ADDITION AND RENOVATIONS TO: FLOYD ELEMENTARY SCHOOL** 725 SOUTH EIGHT MILE ROAD, MIDLAND, MICHIGAN 48640 - NEW ENTRY CANOPY - REMODEL FOR STAFF LOUNGE RELOCATION - CEILING AND LIGHTING REPLACEMENT - DOOR REPLACEMENT - MECHANICAL RENOVATIONS - LIGHTING REPLACMENT **PROJECT E: ADDITION AND RENOVATIONS TO PINE RIVER ELEMENTARY SCHOOL** 1894 PINE RIVER ROAD, MIDLAND, MICHIGAN 48640 - NEW CLASSROOM ADDITION - REMOVAL OF EXISTING PORTABLE CLASSROOM UNIT - KITCHEN HOOD & MAKE-UP AIR UNIT REPLACEMENT
OWNER:	**BULLOCK CREEK SCHOOLS** 1420 SOUTH BADOUR ROAD MIDLAND, MICHIGAN 48640
CONSTRUCTION MANAGER:	**WOLGAST CORPORATION** 4835 TOWNE CENTER ROAD, SUITE 203 SAGINAW, MICHIGAN 48604
ARCHITECT & MECHANICAL ENGINEERING:	**THA ARCHITECTS ENGINEERS** 817 EAST KEARSLEY STREET FLINT, MICHIGAN 48503
ELECTRICAL ENGINEERING:	**MATRIX COUNSULTING ENGINEERS** 544 CHERBOURG DRIVE LANSING, MICHIGAN 48917
STRUCTURAL ENGINEERING:	**ROBERT DARVAS ASSOCIATES** 440 SOUTH MAIN STREET ANN ARBOR, MICHIGAN 48104
CONTRACT DOCUMENTS DATE:	**October 19, 2026**

SECTION 00 01 10

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01 - Project Title Page

00 01 10 - Table of Contents

SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

01 09 13 - General Commissioning Requirements

01 10 01 - Substitution Request Form

01 10 04 - Electronic File Transfer Policy

01 33 01 - Submittal Summary

DIVISION 02 -- EXISTING CONDITIONS

02 41 00 - Demolition

02 41 13.13 - Pavement Removal

DIVISION 03 -- CONCRETE

03 30 00 - Cast-in-Place Concrete

03 35 11 - Concrete Floor Finishes

03 35 23 - Exposed Aggregate Concrete Finishing

DIVISION 04 -- MASONRY

04 20 00 - Unit Masonry

04 42 02 - Cut Stone

DIVISION 05 -- METALS

05 12 00 - Structural Steel Framing

05 21 00 - Steel Joist Framing

05 31 00 - Steel Decking

05 40 00 - Cold-Formed Metal Framing

05 44 00 - Cold-Formed Metal Trusses

05 50 00 - Metal Fabrications

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

06 10 00 - Rough Carpentry

06 20 00 - Finish Carpentry

06 41 00 - Architectural Wood Casework

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

07 21 00 - Thermal Insulation

07 27 00 - Air Barriers

07 41 13 - Metal Roof Panels

07 42 01 - Aluminum Composite Panels

07 42 13 - Metal Wall Panels

07 54 00 - Thermoplastic Membrane Roofing

07 62 00 - Sheet Metal Flashing and Trim

07 72 53 - Snow Guards
07 84 00 - Firestopping
07 90 05 - Joint Sealers
DIVISION 08 -- OPENINGS
08 12 13 - Hollow Metal Frames
08 14 16 - Flush Wood Doors
08 16 01 - Insulated Composite Doors
08 43 13 - Aluminum-Framed Storefronts
08 51 13 - Aluminum Windows
08 71 00 - Door Hardware
08 71 01 - Door Hardware Schedule
08 80 00 - Glazing
DIVISION 09 -- FINISHES
09 05 61 - Existing Flooring Removal and Preparation
09 21 16 - Gypsum Board Assemblies
09 51 00 - Acoustical Ceilings
09 54 21 - Metal Pan Ceilings
09 65 00 - Resilient Flooring
09 67 00 - Resinous Floor Coating
09 68 13 - Tile Carpeting
09 78 00 - Interior Wall Paneling
09 90 00 - Painting and Coating
09 90 01 - Dryfall Painting
09 96 00 - High Performance Coatings
DIVISION 10 -- SPECIALTIES
10 11 01 - Visual Display Boards
10 14 00 - Interior Signage
10 14 02 - Exterior Signage and Identifying Graphics
10 21 13.19 - Plastic Toilet Compartments
10 28 00 - Toilet, Bath, and Laundry Accessories
10 44 00 - Fire Protection Specialties
10 51 02 - Locker Refurbishing
10 51 13 - Metal Lockers
DIVISION 11 – EQUIPMENT
11 68 33.43 - Track and Field Equipment
DIVISION 12 – FURNISHINGS
12 24 01 - Roller Window Shades
DIVISION 13 -- SPECIAL CONSTRUCTION – NOT USED
DIVISION 14 -- CONVEYING EQUIPMENT – NOT USED
DIVISION 20 -- MECHANICAL
20 00 00 - Basic Mechanical Requirements
DIVISION 21 -- FIRE SUPPRESSION – NOT USED
DIVISION 22 -- PLUMBING

22 05 53 - Identification for Plumbing Piping and Equipment
22 07 19 - Plumbing Piping Insulation
22 08 00 - Commissioning of Plumbing
22 10 05 - Plumbing Piping
22 10 06 - Plumbing Piping Specialties
22 40 00 - Plumbing Fixtures
DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)
23 05 93 - Testing, Adjusting, and Balancing for HVAC
23 07 13 - Duct Insulation
23 07 19 - HVAC Piping Insulation
23 08 00 - Commissioning of HVAC
23 09 01 - Building Management and Control System
23 09 02 - Control Sequences
23 21 13 - Hydronic Piping
23 21 14 - Hydronic Specialties
23 21 23 - Hydronic Pumps
23 23 00 - Refrigerant Piping
23 25 00 - HVAC Water Treatment
23 31 00 - HVAC Ducts and Casings
23 33 00 - Air Duct Accessories
23 34 23 - HVAC Power Ventilators
23 37 00 - Air Outlets and Inlets
23 38 13 - Commercial-Kitchen Hoods
23 52 16 - Condensing Boilers
23 63 13 - Air Cooled Refrigerant Condensers
23 73 13 - Modular Central-Station Air-Handling Units
23 74 13 - Packaged Outdoor Central Station Air Handling Units
23 74 14 - Packaged Outdoor Central Air Handling Units (RTU-3)
23 81 01 - Terminal Heat Transfer Units
DIVISION 26 -- ELECTRICAL
26 05 05 - Selective Demolition for Electrical
26 05 19 - Low-Voltage Electrical Power Conductors and Cables
26 05 26 - Grounding and Bonding for Electrical Systems
26 05 29 - Hangers and Supports for Electrical Systems
26 05 33.13 - Conduit for Electrical Systems
26 05 33.16 - Boxes for Electrical Systems
26 05 53 - Identification for Electrical Systems
26 08 00 - Electrical Commissioning and Testing Requirements
26 22 00 - Low-Voltage Transformers
26 24 16 - Panelboards
26 27 26 - Wiring Devices
26 28 13 - Fuses
26 28 16.16 - Enclosed Switches

26 51 00 - Interior Lighting
26 56 00 - Exterior Lighting

DIVISION 27 -- COMMUNICATIONS – NOT USED

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

28 46 00 - Fire Detection and Alarm

DIVISION 31 -- EARTHWORK

31 23 01 - Excavating, Filling and Grading
31 25 00 - Soil Erosion and Sedimentation Control
31 37 00 - Rip Rap

DIVISION 32 -- EXTERIOR IMPROVEMENTS

32 11 24 - Aggregate Base
32 12 16 - Asphalt Paving
32 13 13 - Concrete Paving
32 92 18 - Lawn Restoration

DIVISION 33 – UTILITIES

33 31 00 - Sanitary Sewer
33 44 01 - Storm Sewers

DIVISION 34 -- TRANSPORTATION - NOT USED

DRAWINGS

THE FOLLOWING DRAWINGS, BOUND SEPARATELY, AND THIS PROJECT MANUAL FORM THE CONSTRUCTION DOCUMENTS:

SHEET NO.	SHEET TITLE

PROJECT 'A' - RENOVATIONS TO: BULLOCK CREEK HIGH SCHOOL

A-G001 TITLE SHEET

A-A100 COMPOSITE FLOOR PLAN
A-A101 TOILET ROOM DEMOLITION PLANS
A-A102 TOILET ROOM ENLARGED PLANS
A-A103 TOILET ROOM REFLECTED CEILING PLANS
A-A104 ENLARGED PLANS
A-A601 DOOR SCHEDULE, ROOM FINISH SCHEDULE, & DETAILS

A-M001 MECHANICAL SCHEDULES
A-M101 MECHANICAL TOILET ROOM ENLARGED PLUMBING PLAN
A-M102 MECHANICAL ENLARGED FLOOR PLANS

A-P101 'A' WING ENLARGED TOILET ROOM PLUMBING PLAN
A-P102 'B' WING ENLARGED TOILET ROOM PLUMBING PLAN
A-P103 'D' WING ENLARGED TOILET ROOM PLUMBING PLAN
A-P104 'E' WING ENLARGED TOILET ROOM PLUMBING PLAN
A-P105 'F' WING ENLARGED TOILET ROOM PLUMBING PLAN

A-E000 ELECTRICAL COVER SHEET
A-E101 TOILET ROOM ELECTRICAL DEMOLITION PLANS
A-E102 TOILET ROOM ELECTRICAL PLANS
A-E103 KITCHEN ELECTRICAL PLANS

A-E601 ELECTRICAL DETAILS AND SCHEDULES

PROJECT 'B' - RENOVATIONS TO: BULLOCK CREEK MIDDLE SCHOOL

B-G001 TITLE SHEET

B-A101 COMPOSITE DEMOLITION PLAN
B-A102 COMPOSITE DEMOLITION REFLECTED CEILING PLAN
B-A103 ENLARGED DEMOLITION PLANS
B-A104 COMPOSITE FLOOR PLAN
B-A105 COMPOSITE REFLECTED CEILING PLAN
B-A106 ROOF PLAN
B-A107 ENLARGED FLOOR PLANS
B-A401 INTERIOR ELEVATIONS
B-A601 ROOM FINISH SCHEDULE & DETAILS

B-M001 MECHANICAL SCHEDULES
B-M002 MECHANICAL SCHEDULES
B-M101 COMPOSITE MECHANICAL DEMOLITION PLAN
B-M102 COMPOSITE MECHANICAL ROOF DEMOLITION PLAN
B-M103 UNIT 'A' MECHANICAL FLOOR PLAN
B-M104 UNIT 'B' MECHANICAL FLOOR PLAN
B-M105 UNIT 'C' MECHANICAL FLOOR PLAN
B-M106 COMPOSITE MECHANICAL ROOF PLAN
B-M107 ENLARGED MECHANICAL PLANS
B-M108 ENLARGED GYMNASIUM & MEZZANINE MECHANICAL DEMOLITION PLAN
B-M109 ENLARGED GYMNASIUM & MEZZANINE MECHANICAL PLAN
B-M501 MECHANICAL DETAILS

B-P101 ENLARGED UNDER FLOOR PLUMBING DEMOLITION PLANS
B-P102 ENLARGED ABOVE FLOOR PLUMBING DEMOLITION PLANS
B-P103 ENLARGED LOCKER ROOM UNDER FLOOR PLUMBING PLAN
B-P104 ENLARGED LOCKER ROOM ABOVE FLOOR PLUMBING PLAN

B-E000 ELECTRICAL COVER SHEET
B-E101 UNIT 'A' ELECTRICAL DEMOLITION PLAN
B-E102 UNIT 'B' ELECTRICAL DEMOLITION PLAN
B-E103 UNIT 'C' ELECTRICAL DEMOLITION PLAN
B-E104 ELECTRICAL ENLARGED DEMOLITION PLANS
B-E105 ELECTRICAL ROOF DEMOLITION PLAN
B-E106 UNIT 'A' ELECTRICAL NEW PLAN
B-E107 UNIT 'B' ELECTRICAL NEW PLAN
B-E108 UNIT 'C' ELECTRICAL NEW PLAN
B-E109 ELECTRICAL ENLARGED NEW PLANS
B-E110 ELECTRICAL ROOF PLAN
B-E601 ELECTRICAL DETAILS AND SCHEDULE

PROJECT 'C'- RENOVATIONS TO: BULLOCK ELEMENTARY SCHOOL

C-G001 TITLE SHEET

C-A101 DEMOLITION PLAN
C-A102 FLOOR PLAN
C-A601 DOOR SCHEDULE & DETAILS

PROJECT 'D' – ADDITION AND RENOVATIONS TO: FLOYD ELEMENTARY SCHOOL

D-G001	TITLE SHEET
D-S001	STRUCTURAL NOTES
D-S002	SPECIAL INSPECTIONS AND TYPICAL DETAILS
D-S100	FOUNDATION PLAN, ROOF FRAMING PLAN, SECTION, AND DETAILS
D-A100	COMPOSITE DEMOLITION PLAN
D-A101	COMPOSITE FLOOR PLAN
D-A102	COMPOSITE ROOF PLAN AND ENLARGED ROOF PLAN
D-A103	DEMOLITION PLAN, PARTIAL FLOOR PLAN, AND REFLECTED CEILING PLAN
D-A104	FOUNDATION PLAN, FLOOR PLAN, RCP, AND ROOF PLAN
D-A201	ELEVATIONS AND BUILDING SECTIONS
D-A301	WALL SECTIONS & ENLARGED DETAILS
D-A601	DOOR SCHEDULE, ROOM FINISH SCHEDULE, INTERIOR ELEVATIONS, AND DETAILS
D-M001	MECHANICAL SCHEDULES
D-M101	UNIT 'A' MECHANICAL FLOOR PLAN
D-M102	ENLARGED MECHANICAL DEMOLITION AND FLOOR PLANS
D-M103	ENLARGED MECHANICAL DEMOLITION AND FLOOR PLANS
D-P101	ENLARGED PLUMBING FLOOR PLANS
D-E000	ELECTRICAL COVER SHEET
D-E101	UNIT 'A' ELECTRICAL DEMOLITION PLAN
D-E102	UNIT 'B' ELECTRICAL DEMOLITION PLAN
D-E103	UNIT 'A' ELECTRICAL NEW PLAN
D-E104	UNIT 'B' ELECTRICAL NEW PLAN
D-E105	ENLARGED ELECTRICAL VIEWS
D-E601	ELECTRICAL SCHEDULES AND DETAILS

PROJECT 'E – PINE RIVER ELEMENTARY SCHOOL – NEW EXTERIOR SIGN

E-G001	TITLE SHEET
E-C100	SITE SURVEY
E-C101	DEMOLITION SITE PLAN
E-C102	SITE DEVELOPMENT PLAN
E-C103	SITE UTILITY AND GRADING PLAN
E-C104	SOIL EROSION AND SEDIMENTATION CONTROL PLAN
E-C105	SOIL MAP INFORMATION
E-C106	TAX MAP INFORMATION
E-S001	STRUCTURAL NOTES
E-S002	SPECIAL INSPECTIONS
E-S003	TYPICAL DETAILS
E-S100	PLANS AND SECTIONS
E-S300	SECTION DETAILS
E-A100	COMPOSITE DEMOLITION PLAN AND COMPOSITE FLOOR PLAN
E-A101	DEMOLITION PLANS, FLOOR PLAN, AND REFLECTED CEILING PLAN
E-A102	DEMOLITION PLANS, SECTIONS, AND DETAILS
E-A103	FOUNDATION PLAN, FLOOR PLAN, RCP, ROOF PLAN
E-A201	ELEVATIONS AND BUILDING SECTIONS
E-A301	WALL SECTIONS

E-A302 WALL SECTIONS
E-A501 DETAILS
E-A601 SCHEDULES

E-M001 MECHANICAL SCHEDULES
E-M101 MECHANICAL COMPOSITE FLOOR PLANS
E-M102 ENLARGED MECHANICAL FLOOR PLAN
E-M103 ENLARGED KITCHEN MECHANICAL PLANS AND ROOF PLANS

E-P101 ENLARGED PLUMBING FLOOR PLANS

E-E000 ELECTRICAL COVER SHEET
E-E101 ELECTRICAL DEMOLITION PLANS
E-E102 ELECTRICAL NEW PLANS
E-E601 ELECTRICAL SCHEDULES AND DETAILS

END OF TABLE OF CONTENTS

SECTION 01 09 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. OPR and BoD documents are included by reference for information purposes only.

B. Additional commissioning requirements may be given in the following sections. All of the following sections apply to work of this section:
   1. Section 22 08 00 - Commissioning of Plumbing: Plumbing systems commissioning requirements.
   2. Section 23 08 00 - Commissioning of HVAC: HVAC systems commissioning requirements.
   3. Section 26 08 00 - Electrical Commissioning and Testing Requirements: Electrical systems commissioning requirements.

1.02 SUMMARY

A. Section includes requirements that apply to the commissioning process.

B. The commissioning process does not take away or reduce the responsibility of the system design team or the installing contractors to provide a finished and fully functioning product that complies with the OPR and construction documents.

C. Commissioning Objective: For the Design and Construction Team to complete a comprehensive system quality control process including system performance demonstrations to the Commissioning Team. The Commissioning Firm provides the documentation/verification of the building systems that they perform in accordance with the requirements of the contract documents.
   1. Commissioning during the construction phase is intended to achieve the following specific objectives:
      a. Verify that applicable equipment and systems are installed and are operating according to the OPR, the manufacturer's recommendations and to industry accepted minimum standards.
      b. Verify that all systems receive adequate operational checkout by installing contractors.
      c. Verify and document proper performance of equipment and systems.

1.03 DEFINITIONS

A. Commissioning: Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent (BOD) and the Owner's operational needs (OPR). This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance and the warranty period with actual verification of performance. The commissioning process encompasses and coordinates the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, performance testing and training.

B. OPR: Owners Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. The include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

C. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

D. CxA: Commissioning Authority.

E. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources and documentation requirements of the commissioning process.

1.04 GENERAL PROVISIONS

A. Attention is directed to the Contract, Construction Manager's General Conditions, and all sections within Division 1 – General Requirements that are hereby made part of this Section of the Commissioning Specifications.

B. Examine all Sections of the Specifications for requirements that affect work under this Section.

C. The commissioning authority and agent are not a substitute for construction administration that is required by the design firm nor code compliance and industry standard construction practices that are required by the trade contractors.

1.05 SYSTEMS TO BE COMMISSIONED

A. Systems to be commissioned shall be listed below. Systems include all interconnected components and are not limited to the equipment listed within this specification.
   1. Heating, Ventilating, and Air Conditioning:
      a. High School
         1) Kitchen Exhaust Hood, Exhaust Fan, Make-up Air Unit and Hood Suppression System, and Controls.
         2) Exhaust Fans.
      b. Middle School
         1) New Control system connected to new and existing equipment.
         2) Boilers and Pumps
         3) Balancing Hydronic system connected to new boilers.
         4) Unit Ventilators.
         5) Condensing units.
         6) Rooftop Units
         7) Air Handling Unit
         8) Exhaust Fans.
      c. Floyd Elementary School
         1) New Control system connected to new and existing equipment.
         2) Unit Ventilators (new and pneumatic control replacement)
         3) Condensing units.
         4) Building pumps.
         5) Balancing Hydronic system in building.
         6) Exhaust Fan.
      d. Pine River Elementary
         1) Kitchen Exhaust Hood, Exhaust Fan, Make-up Air Unit and Hood Suppression System, and Controls.
         2) Exhaust Fans.
         3) New Control system connected to new equipment.
         4) Rooftop Units
         5) Hot water coils.
         6) Exhaust Fans.
      e. All Schools
         1) Major and minor equipment items.
         2) Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
   2. Plumbing Systems:
      a. Plumbing Piping.
   3. Lighting Controls Systems:
      a. Occupancy/Vacancy Sensors.
      b. Manual Operations.
      c. Controls integration where applicable.
   4. Power Distribution Systems:
      a. Transformers.

1.06 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. The following are Required Submittals:
   1. Commissioning Plan.
   2. Systems Progress & Testing Schedule (Commissioned Systems Only).
   3. TAB Readiness Report.
   4. Commissioning Report.
   5. Systems Manual.
   6. On-going Commissioning Plan-Maintenance Manual.

1.07 COMMISSIONING PROCESS (CONSTRUCTION PHASE UP THRU WARRANTY PHASE OF PROJECT)

A. The Owner shall champion the commissioning process with the Commissioning Firm to commission the building systems to the quality standards and procedures specified herein.

B. The Construction Manager shall work closely with the Commissioning Firm in establishing and maintaining the schedule of commissioning events for the commissioning of systems and activities noted below.

C. The primary role of the Commissioning Authority during the construction phase is to develop and coordinate the execution of a testing plan, observe and document installation and performance - that systems are installed and functioning in accordance with the OPR and documented basis of design (BOD) and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified testing with portable data-loggers, which shall be supplied by the CxA. The CxA shall not assume responsibility for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving and resolution of non-conformance and deficiencies, but ultimately that responsibility resides with the Owner, CM and the Design Professionals.

D. Commissioning Plan:
   1. The Cx plan provides guidance in the execution of the commissioning process.
   2. The Cx Plan provided as part of the bid documents is binding on the Contractor.
   3. Just after the commissioning scoping meeting (see below) the CxA will update the plan, which is the considered the “final” plan, though it will continue to evolve and expand as the project progresses.

E. Scheduling: The CxA will work with the CM according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CM for scheduling commissioning activities. The CM will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner.
   1. The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The Cx Plan provides a format for this schedule. As construction progresses more detailed schedules are developed by the CxA.

F. Commissioning of the selected systems shall consist of demonstration and documentation of system readiness prior to demonstration **using** the PFPT checklists. The PFPT shall be developed and provided to the Contractors by the Commissioning Firm and shall be used in concert with the suggested manufacturer start-up checklists as part of contract start-up.

G. Commissioning of the selected systems shall consist of demonstration of the interactive system operation through the use of finalized Functional Performance Test (FPT) narratives. The FPT narratives shall be completed with input during the Construction Phase from the Contractor and used to verify operation per design intent through all modes and conditions. Facility staff shall participate and receive on-the-job training during the Functional Performance Testing.

H. Prior to Project Closeout, the Commissioning Firm shall work with the Contractor to compile the Re-Commissioning Management Manual.

I. In the Post-Construction Phase, the Commissioning Firm shall facilitate a 10-month Warranty/Project Closeout meeting.

1.08 COMMISSIONING TEAM

A. The Commissioning Team shall consist of representatives from the following parties involved in the design and construction of this facility:
   1. Owner’s Project Manager.
   2. Owner’s Facility Manager.
   3. Commissioning Firm.
   4. Design Team Professionals (associated with system to be commissioned).
   5. Construction Manager.
   6. Testing Adjusting & Balancing (TAB) Contractor.
   7. Trade (Installation) Contractors (associated with system to be commissioned).
   8. Controls Contractor.
   9. Equipment Manufacturers (associated with system to be commissioned).

1.09 COMMISSIONING AUTHORITY GENERAL REQUIREMENTS

A. The Commissioning Authority and Agents shall lead the commissioning process and be under direct contract with the Construction Manager.

B. The Commissioning Authority and Agents shall provide all documentation for completion by the design professionals, the trade contractors, and the commissioning authority as indicated in the commissioning plan or herein.

C. The Commissioning Authority shall provide a web-based collaboration application that will aid in managing all commissioning documentation and allow for Commissioning Team interaction and collaboration.

D. The Commissioning Agents shall visually inspect all systems being commissioned and document the deficiencies in a System Specific Inspection Checklist and Cx Action Log. These Checklists should be completed and submitted to the commissioning team at Equipment Rough-In, and PreStartup Stages.

E. The Final Commissioning Report must include an Executive Summary that provides recommendations for each HVAC, Plumbing, Electrical, and Life Safety System that is commissioned.

1.10 COMMISSIONING TEAM RESPONSIBILITIES

A. All Parties:
   1. Follow the Cx Plan.
   2. Attend commissioning scoping meeting and additional meetings, as necessary.
   3. Properly schedule, log, and discharge commissioning activities and responsibilities throughout this project.

B. Owner Project Manager:
   1. Champion and facilitate the commissioning process.
   2. Provide the OPR to the CxA and the Design Professionals.
   3. Review and comment on any revisions to the Basis of Design Document.
   4. Provide the Basis of Design Document, prepared by the Design Professional and approved by the Owner, to the CxA, and each contractor for use in developing the Commissioning Plan, systems manual, and operation and maintenance training plan.
   5. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and training sessions.
   6. Attend commissioning specific coordination meetings.
   7. Participate in Functional Performance Testing.
   8. Participate in system education/training.
   9. Provide final approval for the completion of the commissioning work.

C. Owner Facility Manager:
   1. Periodically visit the construction site to become familiar with the project equipment/system installation.
   2. Attend all commissioning coordination meetings.
   3. Review equipment, system and control submittals for compliance with Design Intent Document.
   4. Work with other commissioning team members to review CMMS preventive maintenance work order system.
   5. Work with other commissioning team members with system education/training.
   6. Witness and, to the greatest extent possible, participate in the following commissioning activities:
      a. Initial equipment startup.
      b. Testing, adjusting and balancing.
      c. Component tests.
      d. Pre-functional Performance Tests.
      e. Functional Performance Test.
   7. Work with the Commissioning Team with interface of automatic control systems with existing building automation system.
   8. Work with other Commissioning Team Members to complete equipment, panel and valve bar code/labeling and tagging.
   9. Work with Commissioning Firm to develop the Re-Commissioning Management Manual.

D. Commissioning Authority:
   1. General:
      a. Champion the commissioning process. Organize and lead the commissioning team.
      b. Coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules, and technical expertise.
      c. Schedule all required meetings.
      d. Maintain meeting minutes for Cx Meetings.
      e. Maintain an issues tracking log.
      f. Track and report progress of systems completion and testing.
   2. Construction Phase:
      a. Update the Commissioning Plan, including sample copy of project specific Prefunctional Checklist, Functional Performance Test, and Cx Systems Progress & Test Plan.
      b. Organize and conduct a construction phase commissioning kick-off meeting including the following:
         1) Review the Cx Plan and document comments;
         2) Review the Commissioning Systems Progress & Testing Plan;
         3) Review sample copy of Pre-functional Checklist (Construction Checklist);
         4) Review sample copy of Functional Performance Tests.
      c. Review equipment, system and control submittals for compliance with OPR and BoD and system commissionability. Respond to comments on submittals.
      d. Author Pre-functional Performance Test Checklists and distribute to the Cx Team for completion by trade contractors and inclusion in the Cx Report.
      e. **Before** startup, collect, and review the approved control sequences; Draft Functional Performance Tests; review BAS trending capabilities, stand alone data logger monitoring, or manual functional testing; collaborate with TC contractor, TAB contractor, and Design Professional until consensus is obtained; Revise Functional Performance Tests as required and distribute to the Cx Team; Include testing each Sequence of Operation for each system and Integrated System Testing.
      f. Participate in regularly scheduled commissioning field coordination meetings facilitated by the Commissioning Firm at 4-6 week intervals (1-2 week intervals the last three months prior to completion) with the Cx Team. The purpose of the meetings will be to review the status of commissioning activities, schedule future activities, and resolve commissioning process issues.
      g. Review Test, Adjust, and Balance execution plan.
      h. Provide an outline to the Trades Contractors what materials are required in the O&M documentation and assist in the assignment of someone who will organize the collection of this process.
      i. Work with other commissioning team members to review O&M Manuals.
      j. Work with other commissioning team members to establish CMMS preventive maintenance work order system.
      k. Work with other commissioning team members to complete equipment, panel and valve bar code labeling/and tagging.
      l. Coordinate commissioning activities onto the project schedule with General Contractor.
      m. Receive and review construction documentation (Requests for Information, Bulletins, Change Orders etc.) for impact on commissioning process.
      n. Respond to comments on mechanical and electrical coordination drawings that have been reviewed for commissionability.
      o. Perform site visits to observe equipment and system Installations according to the OPR and the Basis of Design Document. Provide verification that no other systems compromise operation and that the system installation is acceptable.
      p. Startup and checkout of equipment shall be completed by the contractor and documented per the manufacturer's instructions and contract documents.
      q. The Commissioning Firm shall apply a sampling method of observation for systems to be commissioned. Witness and observe to the greatest extent possible, participate in the following commissioning activities

1) Pre-functional Performance Tests:
2) Initial equipment startup - Review the building automation system contractor check out plan and oversee a sufficient portion of the checkout PRIOR TAB being executed.
3) Witness HVAC piping test and flushing procedure, sufficient to be confident that proper procedures were followed. Notify Owner's project manager of any deficiencies in results or procedures.
4) Witness ductwork leakage testing procedure, sufficient to be confident that proper procedures were followed. Notify Owner's project manager of any deficiencies in results or procedures.
5) Testing and balancing - Approve the air and water balancing via TAB contractor random field check of TAB report

r. Coordinate, witness, document and approve manual functional tests performed by installing contractors. Coordinate Integrated System Testing AND retesting as necessary until satisfactory performance is achieved.
1) Maintain an Issues Log and a separate testing record. Provide the CM with written reports with recommended actions.
2) Sign-off (final approval) on individual commissioning tests as completed and passing. Recommend completion of the commissioning process to the Owner.

s. Orchestrate (with support of other commissioning team members) system education/training and provide written verification that training was conducted for all commissioning features and systems. Training program needs to address all training/education aspects as per OPR compliance.
t. Work with building automation system contractor to create and maintain system trending data. Ensure that all points are reading and reporting as expected and visually verify operation.
u. Analyze any functional performance trend logs and monitoring data to verify performance.
v. Compile and maintain a commissioning record.
w. Compile test data, inspection reports, and certificates; Include them in the commissioning report.

3. Post-Construction Phase:
a. Facilitate in a Warranty/Project Closeout meeting at month 10.
b. Coordinate and supervise required seasonal or deferred functional performance testing and deficiency corrections.
c. Complete Final Commissioning Report document.

E. Design Professionals:
1. Construction Phase:
a. Perform normal submittal review, construction observation, as-built drawing preparation, etc., as contracted.
b. Attend Commissioning Meetings per contract requirements.
c. Respond to RFIs generated through the commissioning process.
d. Assist in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings, or equipment documents are not sufficient for writing detailed testing procedures.
e. Fulfill construction administration per their contract with the Design Professional and Owner.

F. Construction Manager - Owner's Representative (CM):
1. General:
a. Champion and support the commissioning process.
b. Assign a single person to manage the commissioning activities on behalf of the CM and serve as a single point of contact and communication for the CM in all commissioning activities.
2. Construction Phase:
a. Construction Manager shall provide Commissioning Firm with normal cut sheets and submittals of equipment/systems to be commissioned.
b. Perform the normal review of Contractor submittals.
c. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.
d. Facilitate commissioning coordination meetings.

e. Manage the master scheduling process with regard to timing and duration of the commissioning activities.
f. Manage the master prefunctional test checklists, master shop drawing log, data retrieval log, O&M Manuals and training schedule log.
g. Immediately following the acceptance of each submittal and no later than 60-days from submittal acceptance, the Contractor's equipment supplier shall complete the Data Retrieval form included within Division 1 as an integral part of the submission process. Included with this form shall be also be the operation and maintenance requirements noted within the Division 1 Specification. In addition, the Contractor shall submit the equipment website where the O&M data can be located.
h. Contractor shall provide a separate area within the Construction Trailer for the assembly of the O&M Manuals. An all-inclusive Table of Contents shall be displayed for the subcontractors to highlight open items and scheduled due dates of O&M insertions. The O&M Manuals will be built on a construction progress basis and will be reflective of each equipment/system that has been accepted and installed thus being in a completed state prior to demonstration of equipment/systems to Owner. Contractor shall assign a Project Coordinator to monitor this process thru to completion.
i. Coordinate the completion and delivery of shop drawings, data retrieval log and O&M Manuals prior to system demonstration to allow Facility staff to reference during system education/training provided by the Contractor and observed by the Commissioning Firm.
j. Ensure that Contractor correct deficiencies and make necessary adjustments to O&M Manuals and as-built drawings for applicable issues in any testing.
k. Coordinate equipment, panel and valve tagging process.
l. Contractor shall coordinate the individual databases (rooms, equipment, valves, panels and components) with the Owner's CMMS operator prior to production of labels. Each database shall be in Microsoft Excel for ease of downloading into the CMMS by the Owner.
m. Contractor shall follow Label Installation Procedures as noted in Construction Manager's General Requirements.
n. Coordinate and schedule all equipment and system education/training.
o. Coordinate and schedule all testing compliance and maintain test log for equipment distribution and systems.
p. Coordinate and schedule Pre-Functional Performance Test and notify Commissioning Firm at least one (1) week prior to scheduled date.
q. Coordinate and schedule the contractor's initial Functional Performance Tests.
r. Coordinate and schedule Functional Performance Test demonstrations to the Owner and the Commissioning Firm at least two (2) weeks prior to scheduled date. Notify Commissioning Firm of any changes of scheduled testing giving Commissioning Firm at least 48-hour notice of change.
s. Coordinate and schedule deferred/seasonal tests in the appropriate season. All heating sequences to be tested in the winter and all cooling sequences in the summer.
t. Ensure that Subs execute seasonal or deferred function performance testing, witnessed by the CxA, according to the Specifications.
u. Coordinate and schedule retest activities.
v. Ensure that commissioning activities are being scheduled into the Master Project Schedule and labeled as "Start-up" (PFPT) and "Demonstration of Systems" (FPT) and such schedule is distributed to Commissioning Team.
w. Include commissioning activities in the master construction schedule and ensure MC, EC, TAB Sub, and TCS Sub participation and responsiveness in the commissioning process. CM is responsible for dividing the Work among Subcontractors and Suppliers and for delineating the work to be performed by specific trades. The following are suggestions as to how the Work may be divided. This is not a complete list of all the work: Refer to the commissioning plan for more detailed information.
x. Enforce on-time submittal of commissioning documentation by TCS Sub, MC, EC, and TAB Sub, especially, but not limited to, construction checklists and systems manual documentation.
y. When necessary, observe and witness construction checklist completion, start-up and functional testing of selected equipment.

z. Furnish CxA a copy of specification-required construction test reports, e.g., pipe cleaning, pipe flushing, pipe and duct leak tests.
aa. Review commissioning progress and Issues Logs.
bb. Coordinate the resolution of deficiencies identified in all phases of commissioning.

G. Trade Contractors:
1. General Requirements:
a. Attend commissioning coordinating meetings.
b. Cooperate with the CxA for resolution of issues recorded in the issues log.
c. Complete the Pre-Functional checklists and submit the completed sign forms and other appropriate start-up sheets.
1) Complete the Pre-Functional checklists as work is completed and provide copies to the CxA or CM on a regularly scheduled basis.
d. Submit completed data retrieval forms for the equipment specified on the preventive maintenance list.
e. Develop and deliver O&M manuals immediately after equipment submittal is approved (typical all equipment).
f. Refine and implement Pre-Functional Performance test procedures and, where applicable, have equipment manufacturer participation.
g. Complete all Pre-Functional Performance Test documentation as outlined in the Cx Plan.
h. Facilitate and execute system & equipment education/training for owner. Coordinate with CM and CxA.
i. Demonstrate systems working with the commissioning team implementing Functional Performance Tests and deferred/seasonal test Functional Performance Tests.
j. Correct all contractor-related deficiencies identified during Functional Performance Tests and retest the corrected functions with the commissioning team.
2. Trade Contractors required to participate in the commissioning process are as follows:
a. Mechanical: HVAC; Sheet Metal.
b. Building Automation.
c. Electrical.
d. Plumbing.
e. Equipment Manufacturers required to participate in the commissioning process that provides self-contained building automation equipment.
3. Electrical Subcontractor:
a. Provide related work as specified herein to support the electrical systems Cx work being performed by CxA.
b. Perform system start-up functions including, but not necessarily limited to: Operate all power generating equipment to confirm proper function.
c. Operate all lighting systems to confirm proper function.
d. Test all fire alarm system to confirm proper function.
e. Correct all electrical system deficiencies identified by CxA.
4. Mechanical Subcontractor:
a. Provide related work as specified herein to support the mechanical systems Cx work being performed by CxA.
b. Perform system start-up functions including, but not necessarily limited to: Operate all motorized equipment to confirm proper function.
c. Correct all mechanical system deficiencies identified by CxA.
5. Temperature Control System (TCS) subcontractor:
a. Provide related work as specified herein to support the mechanical systems Cx work being performed by CxA.
b. In a timely manner, review and comment on feasibility of functional test (FT) steps as developed by CxA.
c. Operate all temperature control devices to support Cx work:
1) Operate each and every phase of the TCS separately, or in conjunction one with the other for a sufficient period of time to demonstrate the ability of the system to meet performance requirements in accordance with the true intent and purpose of these Specifications.

2) TCS Subcontractor is responsible for verifying and demonstrating that each Sequence of Operation is being performed and design conditions stably maintained under operating conditions through the use of FT procedures. TCS Subcontractor shall work with CxA in development of FT procedures.
3) Make available to CxA computer dial-in capability and required software for duration of Cx activities. CxA shall have sufficient access software points via modem.
4) Prior to the system demonstrations with the commissioning team, perform systems shakedown, including a "dry-run" of the forthcoming Functional Performance Tests and submit documented results to the Commissioning Firm.
5) Correct all TCS system deficiencies identified by CxA.

H. Equipment Manufacturers / Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing as specified in agreements with Subs.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CxA.
4. Through the contractors to whom they supply products, analyze specified products and verify that the designer has specified the newest most updated equipment.
5. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
6. Review test procedures for equipment installed by factory representatives.
7. Equipment Manufacturers of commissioned equipment are required to participate in the commissioning process. Participation shall include demonstration of furnished equipment operation and packaged control system functions.
8. Prior to the systems demonstrations with the commissioning team, perform system Functional Performance Tests in conjunction with the Installation Trade Contractor.
9. Demonstrate systems working with the commissioning team implementing Functional Performance Tests in conjunction with the Installation Subcontractor.
10. Demonstrate systems working with the commissioning team implementing deferred/seasons test Functional Performance Tests in conjunction with the Installation Subcontractor.
11. Correct all equipment deficiencies identified during Functional Performance Tests and retest the corrected functions with the commissioning team.

I. Testing, Adjusting, Balancing (TAB) Contractor Agency:
1. Attend all commissioning coordination meetings.
2. Prior to installation of equipment submit a TAB Plan to the Engineer Design Professional Firm and the CxA for review and approval.
3. Visit the site prior to equipment startup to review installation and complete a field report for TAB readiness. Submit TAB readiness report to design professional and CxA.
4. Provide timely notice to mechanical Subcontractor and CxA of all incomplete work and deficiencies which prevent proper performance of work.
5. Cooperate with the CxA for resolution of issues recorded in the issues log.
6. Complete the Pre-Functional Test and submit the completed sign forms and other appropriate start-up sheets.
   a. Complete the Pre-Functional Tests **as work is completed** and provide copies to the CxA or CM on a regularly scheduled basis.
7. Submit TAB industry standard requirement including but not limited to schematic flow diagrams of each system to be commissioned with points where TAB readings will be taken, TAB strategy, and field notes.
8. Review and comment on field coordination drawings during the mechanical-electrical field drawing coordination meetings relative to testing, adjusting and balancing.
9. Participate in Pre-Functional Performance Tests and complete all test checklists as indicated in the Cx Plan.
10. Complete testing, adjusting and balancing of systems.
11. Participate in Functional Performance Tests.

12. Provide system performance verification data for commissioned systems.
13. Test, adjust, and balance all air and hydronic systems and prepare final report.
14. Correct all deficiencies in TAB work and TAB report as identified by CxA.

PART 2 PRODUCT

2.01 COMMISSIONING DOCUMENTATION

A. The Trade Contractors shall provide the following documentation for inclusion in the commissioning report:
   1. Startup Reports.
   2. Completed Pre-Functional Test Checklists (blank checklists are provided by the CxA).
   3. Certificate of Readiness certifying that installation, prestart checks, and startup procedures have been completed (blank certificates are provided by the CxA).
   4. Certificate of Completion certifying that systems, subsystems, equipment, and associated controls are ready for testing (blank certificates are provided by the CxA).
   5. Test and Inspection Reports and Certificates.

B. The CxA shall provide the following documentation for inclusion in the commissioning report:
   1. A commissioning plan that outlines the process for delivery and review of submittals, system manuals, process and schedule for completing pre-functional checklists, startup reports, and functional testing.
   2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
   3. Certificates of Readiness.
   4. Certificates of Completion
   5. Test and Inspection Reports and Certificates.
   6. Corrective Action Log
   7. Verification of Testing, Adjusting, and Balancing Reports.

2.02 TEST EQUIPMENT

A. All standard testing equipment required to perform start-up and initial checkout and required functional testing shall be provided by the contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment shall be included in the base bid price, and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Portable data logging equipment and associated software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in the Owner's project requirements document. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have resolution of 0.1 degrees F and calibration within 6 months of use to an accuracy of ±0.5 degrees F. Pressure sensors shall have been calibrated within 6 months of use to an accuracy of ±3.0% of the value being measured (not full range of device)
   1. All calibration shall be to NIST traceable standards. (National Institute of Standards and Technology - www.nist.gov, 301-975-6478).
   2. All equipment shall be calibrated according to the manufacturer's recommended intervals and immediately after being dropped or damaged.
   3. Calibration tags shall be affixed or certificates readily available.

PART 3 EXECUTION

3.01 COMMISSIONING GOALS

A. The goal is to test/demonstrate the building systems to verify and document that they perform in accordance with the requirements of the OPR, the BoD, and the contract documents.
   1. A comprehensive, reusable Commissioning, Re-Commissioning, and Retro-Commissioning Plan
   2. Documented benefits from the Commissioning process
   3. A Commissioning Specification/Plan that defines the trade contractors' responsibilities as part of the commissioning process.

4. Pre-Functional Performance Tests narratives to document the startup of equipment and systems and for future operation and maintenance information.
5. Functional Performance Tests narratives to document the system performance, verification process and for future Re-Commissioning, and Retro-Commissioning Plan(s), as well as a lesson plan for system training in the future.
6. A Re-Commissioning Management Manual for sustainable facility management.

3.02 COMMISSIONING RESPONSIBILITY MATRIX

Work Description	TAB	Mech Contr	Elec Contr	Temp Cntrl Contr	GC	CxA	Design Professional	Owner's Rep.
Develop Cx Plan				S	S	P	S	S
Coordinate Cx Activities				S	S	P		
Prepare Construction Checklist Packages / Prefunctional Checklists						P		
Complete Construction Checklist Packages / Prefunctional Checklists	S	S	S	S	P			
Start-up and Debug	S	S	S	S	P	S		S
Prepare FPT's				S		P	S	
Preform FPT's		S	S	P		S		
Prepare Final Cx Report						P		
Review Cx Report							P	S
TAB Work	P	S	S	S				
Verify TAB Report Validity	S					P	S	
Owner Training		S	S	S	P			
Prepare Systems Manual		S	S	S	S	P	S	

P = Primary Responsibility

S = Support Role

3.03 PRE-FUNCTIONAL PERFORMANCE TESTS NARRATIVES

A. The Pre-Functional Performance Test Checklists will be included in the Commissioning Plan. The Commissioning Plan will be distributed at the "Kickoff" Commissioning Mtg.

B. Using the enhanced Pre-Functional Performance Test Checklists, the Contractor and/or installation Subcontractor shall complete the Pre-Functional Test and submit the completed sign forms and other appropriate start-up sheets, but limited to the equipment manufacturer's start-up sheets. Subcontractor shall submit the completed forms, initialed by the technician in-charge and attach other appropriate start-up sheets including but not limited to equipment manufacturer's start-up sheets. TAB contractor's field reports, etc., prior to the start of the Owner demonstration of the Functional Performance Tests.

3.04 FUNCTIONAL PERFORMANCE TEST NARRATIVES

A. Functional Performance Test Narratives will be included with the Commissioning Plan and will be in a "draft" format and will be finalized upon final approved sequence of operations and comments from the disciplines involved in demonstrating the systems to the Owner.

B. The Contractor shall review and comment on the test actions specified in the Draft Functional Performance Test Narratives located in the Commissioning Plan and return documents to the Commissioning Firm prior to system commissioning.

C. The Commissioning Firm shall revise the Functional Performance Test Narratives during the Construction Phase to incorporate any changes required to comply with the approved submittals and any contract

document changes. The revised Functional Performance Test Narratives shall be issued as Final and Approved for Executed Documents.

D. Functional Performance Test Narratives will be included with the Commissioning Plan and will be in a “draft” format and will be finalized upon final approved sequence of operations and comments from the disciplines involved in demonstrating the systems to the Owner.

E. The Contractor shall review and comment on the test actions specified in the Draft Functional Performance Test Narratives located in the Commissioning Plan and return documents to the Commissioning Firm prior to system commissioning.

F. The Commissioning Firm shall revise the Functional Performance Test Narratives during the Construction Phase to incorporate any changes required to comply with the approved submittals and any contract document changes. The revised Functional Performance Test Narratives shall be issued as Final and Approved for Executed Documents.
   1. Functional Performance Test Narratives will be included with the Commissioning Plan and will be in a “draft” format and will be finalized upon final approved sequence of operations and comments from the disciplines involved in demonstrating the systems to the Owner.
   2. The Contractor shall review and comment on the test actions specified in the Draft Functional Performance Test Narratives located in the Commissioning Plan and return documents to the Commissioning Firm prior to system commissioning.
   3. The Commissioning Firm shall revise the Functional Performance Test Narratives during the Construction Phase to incorporate any changes required to comply with the approved submittals and any contract document changes. The revised Functional Performance Test Narratives shall be issued as Final and Approved for Executed Documents.

3.05 RE-COMMISSIONING MANAGEMENT MANUAL

A. The Contractor shall be responsible for coordination and development of the Re-Commissioning Manual beginning immediately following the acceptance of equipment and component submittals.

B. The Re-Commissioning Manual shall include:
   1. Design Team, Construction Team, Commissioning Firm and Owner.
   2. Brief Description of each system commissioned.
   3. Record documents Sequence of Operation.
   4. Building Occupancy Schedules.
   5. Trending Checklist with control logic to each trending program.
   6. Equipment start-up, shutdown and restarting instructions.
   7. Equipment manufacturer’s re-calibration instructions for sensors, transmitters and actuators and frequency of tasking.
   8. Listing of all systems commissioned adjustable setpoints and reset schedule with description of set point purpose and recommended adjustable range.
   9. Automatic control manufacturer’s recommended re-commissioning interval and continuous commissioning recommendations, as well as recommendation to reassess setpoints and schedule based on current system use.
   10. Recommended energy monitoring and benchmarking of energy metering (all utilities) using the building automation for energy reporting.

3.06 WARRANTY PERIOD / PERSISTANCE PHASE

A. The goals of the commissioning tasks during the Warranty Period include the following:
   1. Identify and correct any outstanding deficiencies.
   2. Perform seasonal and other deferred functional performance testing.
   3. Review facility operation at 10-month mark into the 12-month warranty period.
   4. Complete Final Commissioning Report document.

B. Team Member Responsibilities:
   1. Owner Project Manager:
      a. Maintain records of problems or concerns associated with the systems during normal operation.
      b. Distribute Post Construction Evaluation information to other commissioning team members for review and comment.

c. Coordinate and facilitate the meeting with the commissioning team at the 10-month mark to discuss operational problems and concerns.
d. Oversee the revision of the Owner Design and Construction Standards based on the results of the 10-month warranty meeting.

2. Owner Facility Manager:
   a. Maintain problems/complaints from occupants and Owner personnel regarding new building systems.
   b. Participate in seasonal/deferred functional performance tests.
   c. Maintain “as-commissioned” proper operation of the building systems.
   d. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
   e. Identify warranty versus operational issues and concerns.
3. Commissioning Firm :
   a. Maintain Commissioning Corrective Action Log until all issues are resolved.
   b. Facilitate seasonal/deferred functional performance tests
   c. Complete Final Commissioning Report document.
   d. Have in place a contractor “near warranty end” or “post occupancy review”.
   e. Complete Final Commissioning Report document.
   f. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
   g. Make suggestions for improvements and for recording these changes in the O&M manuals.
4. Design Professionals:
   a. Be available to consult on the results of the seasonal/deferred functional performance test results.
   b. Meet with the commissioning team at the 10-month mark to discuss operational problems and concerns.
5. Construction Manager:
   a. Coordinate scheduling of seasonal/deferred functional performance tests.
   b. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
   c. Address outstanding warranty issues and tasks identified as being under the original construction contract.
6. Installation Contractors:
   a. Be present for and conduct seasonal/deferred functional performance tests.
   b. Address outstanding warranty issues and tasks identified as being under the original construction contract.
   c. Be available to meet with the commissioning team at the 10-month mark to discuss operational problems, issues, and concerns.
   d. Address outstanding warranty issues and tasks identified as being under the original construction contract.
7. Equipment Manufacturers:
   a. Address outstanding warranty issues and tasks identified as being under the original construction contract.
   b. Be available to meet with the commissioning team at the 10-month mark to discuss operational problems, issues and concerns.
   c. Address outstanding warranty issues and tasks identified as being under the original construction contract.

END OF SECTION

SECTION 01 10 01

SUBSTITUTION REQUEST FORM

PROJECT NAME: _____

PROJECT NO: _____

Contractor/Vendor Name: _____

Street Address: _____

City, State, ZIP: _____

Telephone: _____ Contact Person: _____

REFERENCE			
Drawing Sheet Number:		Specification Section Number:	
Detail Number:		Paragraph Number:	
Specified Product Manufacturer:			

A. Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Proposed Substitution (Mfg., Model No., Etc.):	

B. Submit with request, all necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

1. Does the substitution affect dimensions, framing layout, structural framing shown on the Drawings?
   a. Yes____ No____ If yes, clearly indicate changes:

_____

_____

_____

2. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?
   a. Yes____ No____ If no, fully explain:

_____

_____

3. What affect does substitution have on other Contracts or other trades?

4. What affect does substitution have on construction schedule?

5. Manufacturer's warranties of the proposed and specified items are:
   1) Same____ Different____ (explain on an attachment)

6. Reason for Request:

7. Attach itemized comparison of specified item(s) with the proposed substitution.
8. Attach accurate cost data comparing proposed substitution with product specified.

C. Certification of Equal Performance and Assumption of Ability for Equal Performance:

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

NAME: _____
(Please Type or Print)

TITLE: _____

SIGNATURE: _____ DATE: _____

Signature above shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

FOR USE BY DESIGN PROFESSIONAL:		
Accepted		Remarks:
Accepted as Noted		
Not Accepted		
Received Too Late		
BY:		**DATE:**

END OF REQUEST FORM

SECTION 01 10 04

THA ARCHITECTS ENGINEERS ELECTRONIC FILE TRANSFER POLICY

THA ARCHITECTS ENGINEERS (THA) WILL PROVIDE ELECTRONIC FILES FOR THE PURPOSE OF PREPARING SHOP DRAWINGS, SUBJECT TO THE FOLLOWING:

TERMS AND CONDITIONS

A. THA's electronic files are compatible with AutoCAD Release 2013.
   1. THA makes no representation as to the compatibility of these files with your hardware or software beyond their release specifications.
   2. Layer names are based on the AIA CAD Layer Guidelines.

B. Data contained on these electronic files is part of THA's instruments of service and shall not be used by you or anyone else receiving this data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse will be at the sole risk and without liability or legal exposure to THA. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against THA, which may arise out of or in connection with your use of the electronic files.

C. Furthermore, you shall, by the fullest extent permitted by the law, indemnify and hold harmless THA from all claims, damages, losses and expenses, including any attorneys' fees arising out of or resulting from your use of these electronic files.

D. These electronic files are not contract documents and THA makes no representation regarding the accuracy or completeness of the electronic documents you receive. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including and without limitation, the need to check, confirm, and coordinate all dimensions and details, take field measurements, verify field conditions, and coordinate your work with that of other contractors for the project.
   1. Titles, dates, dimensions, notes, and other data may be deleted from these files.
   2. Significant differences may exist between the electronic files and corresponding hard copy contract documents due to addenda, change orders, or other revisions.
   3. In the event a conflict arises between the signed documents prepared by THA and the electronic files, the signed contract documents shall govern.

E. Because of the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, THA reserves the right to remove all indication of its ownership and/or involvement for each electronic display.

F. Under no circumstances shall the delivery of the electronic files for your use by you be deemed a sale by THA, and THA makes no warranties, either expressed or implied, of the merchantability and fitness for any particular purpose. In no event shall THA be liable for any loss of profit or any consequential damages.

G. THA will provide the electronic files as indicated by name, file size, and date on the attached transmittal. By your acceptance of these electronic files, you agree to the terms and conditions as stated above.

END OF SECTION

SECTION 01 33 01

SUBMITTAL SUMMARY

THE SPECIFICATION SECTIONS LISTED ON THE FOLLOWING PAGES INCLUDE, BUT ARE NOT LIMITED TO, THE SECTIONS THAT REQUIRE FORMAL SUBMITTALS FOR THE DESIGN PROFESSIONAL'S REVIEW.

CONTRACTORS SHALL THOROUGHLY REVIEW ALL SECTIONS TO ENSURE THAT ALL PRODUCT DATA, SHOP DRAWINGS, SAMPLES, CERTIFICATES AND OTHER DOCUMENTS ARE SUBMITTED IN A TIMELY AND ACCURATE MANNER.

SECTION NUMBER & NAME	Product Data	Shop Drawings	Samples	Mock-ups
DIV 01				
01 09 13 – General Commissioning Requirements	X			
DIV 03				
03 30 00 – Cast-in-Place Concrete	X	X		
03 35 11 – Concrete Floor Finishes	X			
03 35 23 – Exposed Aggregate Concrete Finishing			X	X
DIV 04				
04 20 00 – Unit Masonry	X			X
04 42 02 – Cut Stone	X	X	X	
DIV 05				
05 12 00 – Structural Steel Framing	X	X		
05 21 00 – Steel Joist Framing		X		
05 31 00 – Steel Decking		X		
05 40 00 – Cold-Formed Metal Framing	X	X		
05 44 00 – Cold-Formed Metal Trusses	X	X		
05 50 00 – Metal Fabrications	X	X		
DIV 06				
06 10 00 – Rough Carpentry	X			
06 20 00 – Finish Carpentry	X	X	X	
06 41 00 – Architectural Wood Casework		X	X	
DIV 07				
07 21 00 – Thermal Insulation	X			
07 27 00 – Air Barriers	X	X		
07 41 13 – Metal Roof Panels	X	X	X	
07 42 01 – Aluminum Composite Panels	X	X	X	
07 42 13 – Metal Wall Panels	X	X	X	
07 54 00 – Thermoplastic Membrane Roofing	X	X		
07 62 00 – Sheet Metal Flashing and Trim	X	X	X	
07 72 53 – Snow Guards	X	X		
07 84 00 – Firestopping	X			
07 90 05 – Joint Sealers	X		X	
DIV 08				
08 12 13 – Hollow Metal Frames	X	X		
08 14 16 – Flush Wood Doors	X	X	X	
08 16 01 – Insulated Composite Doors	X	X	X	
08 43 13 – Aluminum-Framed Storefronts	X	X	X	
08 51 13 – Aluminum Windows	X	X		
08 71 00 – Door Hardware	X	X		
08 80 00 – Glazing	X			

SECTION NUMBER & NAME	Product Data	Shop Drawings	Samples	Mock-ups
DIV 09				
09 05 61 – Existing Flooring Removal and Preparation	X			
09 21 16 – Gypsum Board Assemblies	X			
09 51 00 – Acoustical Ceilings	X			
09 54 21 – Metal Pan Ceilings	X			
09 65 00 – Resilient Flooring	X		X	
09 67 00 – Resinous Floor Coating	X		X	
09 68 13 – Tile Carpeting	X		X	
09 78 00 – Interior Wall Paneling	X	X		
09 90 00 – Painting and Coating	X		X	
09 90 01 – Dryfall Painting	X			
09 96 00 – High Performance Coatings	X		X	X
DIV 10				
10 11 01 – Visual Display Boards	X	X	X	
10 14 00 – Interior Signage	X	X	X	
10 14 02 – Exterior Signage and Identifying Graphics	X	X	X	
10 21 13.19 – Plastic Toilet Compartments	X	X	X	
10 28 00 – Toilet, Bath, and Laundry Accessories	X			
10 44 00 – Fire Protection Specialties	X	X		
10 51 02 – Locker Refurbishing	X	X	X	
10 51 13 – Metal Lockers	X	X	X	
DIV 11				
11 68 33.43 – Track and Field Equipment	X	X		
DIV 12				
12 24 01 – Roller Window Shades	X	X	X	
DIV 22				
22 05 53 – Identification for Plumbing Piping and Equipment	X			
22 07 19 – Plumbing Piping Insulation	X			
22 08 00 – Commissioning of Plumbing	X			
22 10 05 – Plumbing Piping	X	X		
22 10 06 – Plumbing Piping Specialties	X	X		
22 40 00 – Plumbing Fixtures	X		X	
DIV 23				
23 05 93 – Testing, Adjusting, and Balancing For HVAC		X		
23 07 13 – Duct Insulation	X		X	
23 07 19 – HVAC Piping Insulation	X			
23 08 00 – Commissioning of HVAC	X			
23 09 01 – Building Management and Control System	X	X		
23 09 02 – Control Sequences	X	X		
23 21 13 – Hydronic Piping	X			
23 21 14 – Hydronic Specialties	X			
23 21 23 – Hydronic Pumps	X			
23 23 00 – Refrigerant Piping	X			
23 25 00 – HVAC Water Treatment	X	X		
23 31 00 – HVAC Ducts and Casings	X	X		
23 33 00 – Air Duct Accessories	X	X		
23 34 23 – HVAC Power Ventilators	X			
23 37 00 – Air Outlets and Inlets	X			
23 38 13 – Commercial-Kitchen Hoods	X	X		

SECTION NUMBER & NAME	Product Data	Shop Drawings	Samples	Mock-ups
23 52 16 – Condensing Boilers	X	X		
23 63 13 – Air Cooled Refrigerant Condensers	X	X		
23 73 13 – Modular Central-Station Air-Handling Units	X	X		
23 74 13 – Packaged Outdoor Central Station Air Handling Units	X	X		
23 74 14 – Packaged Outdoor Central Air Handling Units (RTU-3)	X	X		
23 81 01 – Terminal Heat Transfer Units	X	X		
DIV 26				
26 05 19 – Low-Voltage Electrical Power Conductors and Cables	X			
26 05 26 – Grounding and Bonding for Electrical Systems	X			
26 05 29 – Hangers and Supports for Electrical Systems	X			
26 05 33.13 – Conduit for Electrical Systems	X			
26 05 33.16 – Boxes for Electrical Systems	X		X	
26 05 53 – Identification for Electrical Systems	X			
26 08 00 – Electrical Commissioning and Testing Requirements	X			
26 22 00 – Low-Voltage Transformers	X	X		
26 24 16 – Panelboards	X	X		
26 27 26 – Wiring Devices	X			
26 28 13 – Fuses	X			
26 28 16.16 – Enclosed Switches	X			
26 51 00 – Interior Lighting	X			
26 56 00 – Exterior Lighting	X			
DIV 28				
28 46 00 – Fire Detection and Alarm	X			
DIV 32				
32 12 16 – Asphalt Paving	X			
32 13 13 – Concrete Paving	X			
DIV 33				
33 31 00 – Sanitary Sewer	X			
33 44 01 – Storm Sewers	X			

END OF SUMMARY

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition.

B. Selective demolition of built site elements.

C. Selective demolition of building elements for alteration purposes.

D. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Construction Manager's General Requirements:
   1. Limitations on Contractor's use of site and premises.
   2. Site fences, security, protective barriers, and waste removal.
   3. Protection of Work and Existing Property.

B. Section 02 41 13.13 - Pavement Removal.

C. Section 31 23 01 - Excavating Filling and Grading.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; Current Edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 5 years of documented experience.

1.06 PROJECT CONDITIONS

A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 23 01.

PART 3 EXECUTION

3.01 SCOPE

A. Remove entire portable classroom unit at Pine River Elementary.

B. Remove paving as required to accomplish new work.

C. Remove foundation walls and footings completely.

D. Remove concrete slabs on grade.

E. Remove other items indicated.

F. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 23 01.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Construction Manager's General Requirements.

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structural elements to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Do not begin removal until specified measures have been taken to protect vegetation to remain.

E. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. If hazardous materials are discovered during removal operations, stop work and notify Construction Manager, Design Professional and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

H. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

I. Partial Removal of Paving: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.

2. Report discrepancies to Design Professional before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
1. Provide, erect, and maintain temporary dustproof partitions of construction.
2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
2. Remove items indicated on drawings.

E. Remove all incidental items, (re: trims, fasteners, wiring, conduit, mounting plates, etc.) not required by and/or interfering with new construction or finishes, whether specifically shown or not.

F. At existing wall or partition openings scheduled for infill, remove any bullnose masonry units and partial (cut) units back to nearest mortar joint so that new masonry may be toothed in to match existing bond patterns.

G. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. See Construction Manager’s General Requirements for other limitations on outages and required notifications.
4. Verify that abandoned services serve only abandoned facilities before removal.
5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

H. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

3.06 SCHEDULE OF PRODUCTS TO BE REMOVED AND RETAINED

A. Remove, store, and protect the following materials and equipment for reinstallation:
1. Toilet Accessories.
2. Ceiling Tile.
3. Light Fixtures.

B. Remove the following materials and equipment to be retained by Owner. Deliver to location designated by Owner.
1. Interior door security boots, floor sleeves and storage case.

C. Owner shall have the "Right of First Refusal" on any item removed during demolition. If Owner does not exercise that right, Contractor shall dispose of all items off site in a legal manner.

END OF SECTION

SECTION 02 41 13.13
PAVEMENT REMOVAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of an existing pavement, including driveways, sidewalks, curb and/or gutter, and parking areas. For purposes of the work "pavement removal", pavement may include bituminous or concrete.

B. Limits of Removal: Pavement shall be removed to the limits shown on the plans, or as directed by the Design Professional in the field. Where pavement is to be removed to allow for the construction of utilities or other improvements, pavement shall be removed to the limits required for their construction.

PART 2 MATERIALS

2.01 NOT APPLICABLE

PART 3 EXECUTION

3.01 PAVEMENT REMOVAL (INCLUDING CURB AND GUTTER REMOVAL)

A. Pavement shall be removed to an existing joint or to a sawed joint. An existing crack is not suitable for the limit of removal. Sawed joints for pavement removal are to be either parallel or perpendicular to the longitudinal centerline. Sawed joints shall extend substantially through the full thickness of the pavement so that a "clean break" is made and that the adjacent pavement or structures that are to remain are not damaged. If adjacent pavement or structures that are to remain are damaged as a result of the Contractor's removal operations, they shall be replaced to the Owner's satisfaction at the Contractor's expense.

B. Broken concrete, bituminous and other debris resulting from pavement removal operations shall become the Contractor's property and disposed of properly.

C. Where pavements are encountered that are composed of more than one material or multiple courses of the same material. The pavement shall be removed in its entirety and all components shall be considered part of the same pavement area.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Structural concrete stoops.

C. Floors and slabs on grade.

D. Concrete foundation walls.

E. Concrete footings.

F. Concrete reinforcement.

G. Joint devices associated with concrete work.

H. Concrete curing.

I. Non-shrink, non-metallic grout.

1.02 RELATED REQUIREMENTS

A. Section 03 35 11 - Concrete Floor Finishes: Floor sealer.

B. Section 03 35 23 - Exposed Aggregate Concrete Finishing.

C. Section 05 12 00 - Structural Steel Framing: for anchor rods to be embedded in concrete.

D. Section 07 90 05 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.

E. Section 09 67 00 - Resinous Floor Coating: Concrete floor topping.

F. Section 32 13 13 - Concrete Paving: Sidewalks, curbs and gutters.

G. Section 20 00 00 - Basic Mechanical Requirements: Mechanical items for casting into concrete.

H. Divisions 26 - Electrical: Electrical items for casting into concrete.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

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

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

E. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

F. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

G. ACI PRC-308 - Guide to External Curing of Concrete; 2016.

H. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).

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

J. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

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

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

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

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

O. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2026.

P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2026c.

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

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

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

T. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

U. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.

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

W. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.

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

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

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

AB. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types); 2018.

AC. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018 (Reapproved 2023).

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

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

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. Portland cement.
   2. Fly ash.
   3. Slag cement.
   4. Blended hydraulic cement.
   5. Silica fume.
   6. Aggregates.
   7. Admixtures.
   8. Vapor retarders.
   9. Liquid floor treatments.
   10. Each type of steel reinforcement.
   11. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
   12. Non-Shrink Grout.
   13. Bonding Agent(s).
   14. Anchor Rods to be Embedded in Concrete.

C. Design Mixtures: Submit proposed concrete mix design.
   1. Minimum 28-day compressive strength.
   2. Durability exposure class.
   3. Maximum w/cm.
   4. Calculated equilibrium unit weight.
   5. Slump limit.

6. Air content.
7. Nominal maximum aggregate size.
8. Indicate amount of mixing water to be withheld for later addition at Project site if permitted.
9. Intended placement method.
10. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
11. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
12. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Steel Reinforcement 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, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

E. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of the Design Professional.

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

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077C1077M and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

D. Field Quality Testing Agency Qualifications: A independent testing agency, acceptable to the authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

E. Perform work of this section in accordance with ACI 301 and ACI 318.

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

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

PART 2 PRODUCTS

2.01 FORMWORK

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

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

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 deformed.
1. Type: Deformed billet-steel bars.

2. Finish: Unfinished.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
   1. Form: Flat sheets.
   2. Mesh Size and Wire Gage: As indicated on drawings.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

D. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I, Type II, Type III - Portland type.
   1. Acquire all cement for entire project from same source.

B. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded.
   1. Acquire all aggregates for entire project from same source.
   2. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
   3. Maximum Coarse Aggregate Size: 1-1/2 inches in footings, foundations, piers, and pedestals, 3/4 inch for balance of work.
   4. 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 in steel-reinforced concrete.
   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.

E. Fly Ash: ASTM C618, Class C.

F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

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

2.04 ADMIXTURES

A. Chemical Admixture Manufacturers:
   1. AXIM: www.aximconcrete.com.
   2. Euclid Chemical Company: www.euclidchemical.com.
   3. Grace Construction Products: www.graceconstruction.com.
   4. Sika Corporation USA: www.usa.sika.com.

B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

C. Air Entrainment Admixture: ASTM C260/C260M.

2.05 ACCESSORY MATERIALS

A. Curing/Sealing Compound (Surfaces scheduled to receive adhered resilient finish flooring materials): Water emulsion, resin base clear liquid type, specifically designed for use on surfaces scheduled to receive adhered finish materials; equivalent to "1100-CLEAR" manufactured by W.R. Meadows, Inc.
   1. Areas scheduled to receive ceramic, quarry, porcelain, terrazzo, stone, clay or any other 'hard' tile shall not receive Curing/Sealing Compounds.

B. Liquid Curing Compound (Surfaces scheduled to remain exposed): ASTM C309, Type 1, clear or translucent, Class B. Provide VOCOMP-25 manufactured by W.R. Meadows, Inc.
   1. Areas scheduled to receive application of material specified in Section 03 39 01 shall not receive Curing/Sealing Compounds listed in this section.

C. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.
   2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
      a. Maximum: Plus 4 percent.
      b. Minimum: Plus 1 percent.
   3. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
   4. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
   5. Products containing aluminum powder are not permitted.
   6. Flowable Products:
      a. SpecChem, LLC; SC Precision Grout: www.specchemllc.com.
      b. SpecChem, LLC; SpecRock: www.specchemllc.com.
      c. W. R. Meadows, Inc; 588-10K: www.wrmeadows.com.
      d. W. R. Meadows, Inc; 1428 HP: www.wrmeadows.com.
      e. W. R. Meadows, Inc; CG-86: www.wrmeadows.com.
      f. W. R. Meadows, Inc; Speed-E-Roc: www.wrmeadows.com.
   7. Low-Slump, Dry Pack Products:
      a. SpecChem, LLC; SC Multipurpose Grout: www.specchemllc.com.
      b. W. R. Meadows, Inc; PAC-IT: www.wrmeadows.com.

D. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
   1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
      a. Maximum Height Change: Plus 4 percent.
      b. Minimum Height Change: Plus 1 percent.
   2. Minimum Compressive Strength at 7 days, ASTM C579: 12,000 pounds per square inch.
   3. Minimum Compressive Strength at 7 days, ASTM D695: 12,000 pounds per square inch.
   4. Products:
      a. SpecChem, LLC; SpecPoxy Grout: www.specchemllc.com.
      b. W. R. Meadows, Inc; REZI-WELD 3/2: www.wrmeadows.com.

2.06 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.
   1. Products:
      a. Adhesives Technology Corporation; Crackbond SLV302, Crackbond LR321, Crackbond LR321 G, Crackbond LR321 LPL, Ultrabond 2100 LPL, Ultrabond 2100, Ultrabond 1, Ultrabond 2, Ultrabond 4CC, Ultrabond HS200, Miracle Bond 1350 or Miracle Bond 1450: www.atcepoxy.com.
      b. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: www.specchemllc.com.
      c. W.R. Meadows, Inc.; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000, or Rezi-Weld 1000 State: www.wrmeadows.com.
      d. Sika: Armatec 110 EPOCHEM: www.usa.sika.com.

B. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
   1. Size: 1/2 inch throat, 1/2 inch deep.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.

D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.
   1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
   2. Height: To suit slab thickness.

E. Sealant and Primer: As specified in Section 07 90 05.

2.07 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. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash or Other Pozzolans: 25 percent by mass.
   2. Slag Cement: 50 percent by mass.
   3. Silica Fume: 10 percent by mass.
   4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceed 10 percent by mass.
   5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

D. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Design Professional for preparing and reporting proposed mix designs.

E. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
   1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete for parking structure slabs and concrete with a w/cm below 0.50.

2.08 CONCRETE MIXTURES

A. All concrete shall be made with Portland cement and stone aggregate, with mixes designed to meet 28-day minimum compressive strengths in various elements of the structure as follows, unless noted otherwise:

ELEMENT	F'C	TYPE	MAX. AGG.	MAX. W/C	MAX. SLUMP
Footings	4,000	I/II	1-1/2 inch	0.49	4 inches (+/- 1 inch)
Walls and Piers	4,500	I/II	3/4 inch	0.46	4 inches (+/- 1 inch)
Int. Slab on Grade	4,000	I/II	3/4 inch	0.46	4 inches (+/- 1 inch)

Note: Air Content: 6 percent, plus or minus 1 percent when exposed to freeze thaw cycles only.

2.09 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Design Professional for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 and ASTM C1116 and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.
   1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
   2. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Daily access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during placement of concrete through the curing period.
   4. Security and protection for test samples and for testing and inspection equipment at Project site.

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

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

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

E. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

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

G. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert structural epoxy then insert steel dowels.

H. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as shown on the drawings. Do not use sand.

I. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

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

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

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. Splices: Lap splices as indicated on Drawings.
   1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 48 bar diameters at splices, or 24 inches, whichever is greater.
   2. Stagger splices in accordance with ACI 318.
   3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
   4. Weld reinforcing bars in accordance with AWS D1.4, where indicated on Drawings.

F. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
   1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice.".
   2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
   3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

G. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.
   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.Anchor rods are to be held in place via a steel template that will be discarded after the lower concrete pier has cured and prior to constructing the pedestal and setting the column.
   3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

H. Comply with ACI 117.

3.04 PLACING CONCRETE

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items, is complete and that required inspections are completed.

B. Place concrete in accordance with ACI 304R.

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

D. Notify Design Professional not less than 24 hours prior to commencement of placement operations.

E. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Design Professional in writing, but not to exceed the amount indicated on the concrete delivery ticket.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

F. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

G. 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.
   5. 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.

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

I. Ensure reinforcement, inserts and embedded parts will not be disturbed during concrete placement.

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

3.05 SLAB JOINTING

A. Do not locate sawcut or tooled joints in composite slabs on metal deck.

B. Place floor slabs in other than pipe or conduit trench infill in a checkerboard or sawcut pattern, maximum 60 feet by 60 feet with sawcut or tooled joints at 15 feet by 15 feet or limit slab aspect ratio to 2 to 1.

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

D. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
   2. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
   3. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
   4. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Control Joints in Slab-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows
   1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16-inch-thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

F. 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 Design Professional.
   2. Place joints perpendicular to main reinforcement.
   3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

G. Doweled Joints:
   1. Install dowel bars and support assemblies at joints where indicated on Drawings.
   2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 ft.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 ft.
   3. Under Carpeting: 1/4 inch in 10 ft.

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

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

3.07 CONCRETE FINISHING

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

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

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
   3. Decorative Exposed Surfaces: "Steel trowel" as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to be polished, and all other slab surfaces.
   4. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
      a. Chemical Hardener: After slab has cured, apply water-diluted hardener in three coats per manufacturer's instructions, allowing 24 hours between coats.

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

3.08 CURING AND PROTECTION

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

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 10 00.

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

C. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

D. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
   1. Testing agency shall 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 shall 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.
   4. Test reports shall include reporting requirements of ASTM C31, ASTM C39, and ACI 301, including the following as applicable to each test and inspection
      a. Project name.
      b. Name of testing agency.
      c. Names and certification numbers of field and laboratory technicians performing inspections and testing.
      d. Name of concrete manufacturer.
      e. Date and time of inspection, sampling, and field testing.
      f. Date and time of concrete placement.
      g. Location in Work of concrete represented by samples.
      h. Date and time sample was obtained.
      i. Truck and batch ticket numbers.
      j. Design compressive strength at 28 days.
      k. Concrete mixture designation, proportions, and materials.
      l. Field test results.

m. Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
n. Type of fracture and compressive break strengths at seven days and 28 days.

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

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

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

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

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

3.10 DEFECTIVE CONCRETE

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

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

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

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

3.11 PROTECTION

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

END OF SECTION

SECTION 03 35 11
CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Liquid densifiers and hardeners.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-In-Place Concrete: Concrete slabs.

B. Section 03 35 23 - Exposed Aggregate Concrete Finishing.

C. Section 09 67 00 - Resinous Floor Coating.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with concrete floor placement and concrete floor curing.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.07 WARRANTY

A. See Construction Manager’s General Requirements for additional warranty requirements.

B. Manufacturer Warranty: Provide two-year manufacturer warranty that a structurally sound concrete surface prepared and treated according to the manufacturer's directions will remain permanently dustproof, hardened and water repellent.

PART 2 PRODUCTS

2.01 DENSIFIERS AND HARDENERS

A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores, hardening, and dustproofing.
   1. Composition: Sodium silicate, with siliconate.
      a. Products:
         1) Curecrete Distribution, Inc; Ashford Formula: www.curecrete.com.
         2) Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

PART 3 EXECUTION

3.01 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.

3.02 GENERAL

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

3.03 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. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

C. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

3.04 PROTECTION

A. Protect installed coatings from subsequent construction operations.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 35 23

EXPOSED AGGREGATE CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exposed aggregate concrete finish.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACIPRC-303 - Cast-in-Place Architectural Concrete Practice—Guide; 2025.

B. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

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

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

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

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Samples: Submit two, 1/4 pound plastic bags of each aggregate specified, illustrating size, color and the extremes of color range.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with ACI PRC-303 and ACI SPEC-301.
   1. Maintain one copy of each document on project site.

1.07 MOCK-UPS

A. Construct mock-up comprised of one horizontal field sample panel, 8’-0” feet long by 8’-0” feet wide, with full aggregate color range represented.

B. Locate where directed.

C. Mock-up may **NOT** remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Provide pigment, surface retarder, and acid etch solution in manufacturer's original packaging, including use instructions.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Main Corridor Floor at Pine River Elementary Addition: Light brown aggregate, 1/4 inch minimum and 3/4 inch maximum size, medium grind exposure.

2.02 EXPOSED AGGREGATE CONCRETE FINISHING

A. Cement: ASTMC150/C150M, Type I - Normal portland type; white color.

B. Pigments: Provide Signature Integral Colors, P2910 Mesa manufactured by Prism Corporation: www.prismpigments.com/color-cards.

C. Admixture: Air entrainment as specified in Section 03 30 00.

D. Water: ASTMC1602/C1602M; clean, potable, and not detrimental to concrete.

E. Aggregate Supplier: Acquire aggregates for entire project from same source.

F. Aggregate: Natural quartz; angular; 1/4 inch minimum size to 3/4 inch maximum size; clean washed type.
   1. No iron bearing aggregate permitted.

2. Color: To be selected from Manufacturers standard colors.
    a. Color from single source throughout.

2.03 ACCESSORIES

A. Surface Retarder for Horizontal Surfaces: Spray-on liquid that retards surface set.
    1. Manufacturers:
        a. Clemons Concrete Coatings: www.clemonsconcretecoatings.com.
        b. Dayton Superior Corporation: www.daytonsuperior.com.
        c. Kaufman Products Inc; Expose: www.kaufmanproducts.net.
        d. L.M. Scofield Company; Lithocast Surface Retarder: www.scofield.com.
        e. W. R. Meadows, Inc; Top-Stop: www.wrmeadows.com.
        f. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. High Gloss Clear Sealer: Non yellowing, transparent combination curing compound and sealer complying with ASTM C309.
    1. Composition: Acrylic.
    2. Vehicle: Solvent-based.
    3. Manufacturers:
        a. W. R. Meadows, Inc; Expo-Gloss: www.wrmeadows.com.
        b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

C. Bonding Agent: _____ type. Provide _____ manufactured by _____ .

2.04 CONCRETE MIX

A. See Section 03 30 00.

2.05 SOURCE QUALITY CONTROL

A. Concrete testing will be performed by an independent testing agency, as provided in Construction Manager’s General Requirements.

B. Test samples in accordance with Section 03 30 00 and comply with ACI SPEC-301.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that items to be cast into concrete are placed securely and will not impede placingconcrete.

B. Notify Design Professional minimum 24 hours prior to commencement of concreting operations.

3.02 PREPARATION

A. Clean formwork surfaces.

B. Apply surface retarder to formwork in accordance with manufacturer's instructions.

C. Clean previously placed concrete with steel brush and apply bonding agent in accordance with manufacturer's instructions.

3.03 PLACING CONCRETE

A. Place concrete in accordance with Section 03 30 00 and comply with ACI SPEC-301.

3.04 AGGREGATE EXPOSURE

A. A. Leave formwork in place until concrete has attained 75 percent of design compressive strength.

B. Immediately after removal of formwork, wash retarded concrete surfaces with water and scrub with stiff bristle brush exposing aggregate to match accepted sample panel.

C. After removal of formwork, wet concrete surfaces with water and scrub with acid etch solution, exposing aggregate to match accepted sample panel.

D. After removal of formwork, apply matrix and aggregate to concrete substrate to uniform texture and to match accepted sample panel.

E. Do **NOT** expose more than 40 percent of aggregate surface.

3.05 CURING

A. Cure concrete floor surfaces as specified in 03 30 00.

3.06 CLEANING

A. When desired finish is achieved, wash and rinse exposed aggregate surfaces.

3.07 DEFECTIVE CONCRETE

A. Patch, cure, and finish imperfections to match adjacent areas.

B. Modify or replace concrete not complying with line, detail, and elevations indicated and appearance requirements.

C. Replace concrete not properly placed.

3.08 PROTECTION

A. Protect concrete from premature drying or staining, excessively hot or cold temperatures, or mechanical injury.

3.09 SCHEDULES

A. Main Corridor and Classroom Floors at Pine River Elementary Addition: Light brown aggregate, 1/4 inch minimum and 3/4 inch maximum size, medium grind exposure. Provide 800 level sheen.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Masonry Units.

B. Clay Facing Brick.

C. Mortar and Grout.

D. Reinforcement and Anchorage.

E. Flashings.

F. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 42 02 - Cut Stone: Stone accents in masonry.

B. Section 05 50 00 - Metal Fabrications: Loose steel lintels.

C. Section 06 10 00 - Rough Carpentry: Nailing strips built into masonry.

D. Section 07 11 13 - Bituminous Dampproofing: Dampproofing parged masonry surfaces.

E. Section 07 21 00 - Thermal Insulation: Insulation for cavity spaces.

F. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

G. Section 07 90 05 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement Grade 60; 2022.

C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.

D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.

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

G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.

H. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.

I. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2026.

J. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

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

L. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

M. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2023.

N. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025a.

O. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.

P. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

Q. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.

R. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2023b.

S. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).

T. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.

U. TMS 402/602- Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Certificate of Compliance: Submit completed Certificate of Compliance for all products/components included in this Section.

C. Product Data: Provide data for the following:
   1. Masonry units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

D. Material Certificates: For each type and size of product:
   1. For masonry units, include data on material properties and material test reports substantiating compliance with requirements.
   2. Cementitious materials.
   3. Mortar admixtures.
   4. Preblended, dry mortar mixes.
   5. Grout mixes.
   6. Reinforcing bars.
   7. Joint reinforcement.
   8. Anchors, ties, and metal accessories.

E. Qualification Data: For testing agency.

F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.
   2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

G. 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.

H. Cold-Weather and Hot-Weather Procedures: Detailed descriptions of methods, materials, and equipment to be used to comply with requirements.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

B. Comply with provisions of TMS 402/602 except where exceeded by requirements of the Contract Documents.

1.06 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 3 feet long by 3 feet high; include mortar and accessories and structural backup in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 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.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

D. 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.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.08 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 masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

E. Deliver preblended, dry mortar mixes in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 2 PRODUCTS

2.01 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 402/602, except as modified by requirements in the Contract Documents.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Defective Units: Reference 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.

E. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
   1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.02 CONCRETE MASONRY UNITS

A. Concrete Masonry Units: Comply with referenced standards and as follows:
   1. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
      a. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   3. Special Shapes: Provide non-standard blocks configured for corners and other detailed conditions.
      a. Provide bullnose units for outside corners.
   4. Non-Loadbearing and Load-Bearing Units: ASTM C90, normal weight.

a. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2,500 psi at 28-days. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength) method according to TMS 402/602.
b. Density Classification: Normal weight.
c. Size (Width): Manufactured to dimensions 3/8-inch less than nominal dimensions.
d. Exposed Faces: Provide color and texture matching the range represented by Design Professional's sample.

2.03 BRICK UNITS

A. Manufacturers:
1. Belden Brick; "Modular 740-479": www.beldenbrick.com. Contact Mark Lariviere Jr., markl@beldenbricksales.com.

B. Facing Brick: ASTM C216, Type FBS, Grade SW.
1. Color and texture to match Design Professional's sample.
2. Nominal size: As indicated on drawings.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.04 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N for brick and Type S for concrete masonry units.

B. Portland Cement: ASTM C150C150M, 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.
1. Not more than 0.60 percent alkali.
2. Hydrated Lime: ASTM C207, Type S.
3. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
4. Mortar Aggregate: ASTM C144.
a. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
5. Grout Aggregate: ASTM C404.

C. 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.

D. Water: Clean and potable.

E. Accelerating Admixture: Nonchloride type for use in cold weather.
1. Submit data to Design Professional for Approval prior to incorporation into the work.

2.05 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
1. Blok-Lok Limited: www.blok-lok.com.
2. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
3. WIRE-BOND: www.wirebond.com.
4. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Uncoated Reinforcing Steel Bars: ASTM A615/A615M Grade 60 deformed billet bars.

C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells 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.

D. Masonry-Joint Reinforcement, General: ASTM A951.
1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Wire Size for Veneer Ties: 0.187-inch diameter.

6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

E. Single Wythe Joint Reinforcement:
1. Type: Ladder.
2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

F. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
1. Type: Ladder, fabricated with moisture drip.
2. ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

G. Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
1. Vertical adjustment: Not less than 2 inches.

H. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

I. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

2.06 FLASHINGS

A. EPDM Flashing: ASTM D4637, Type I, 0.040 inch thick.

B. Stainless Steel Drip Edges: ASTM A167, Type 304; 28 gauge (0.015") thick.
1. Metal Configuration: Extend a minimum of 3 inches horizontally into the wall and 1/4 inch outward from the exterior face of the wall with the outer edge bent at a 30 degree angle downward and hemmed.

C. Flashing Sealant/Adhesive: Butyl type as specified in Section 07 90 05.

2.07 ACCESSORIES

A. Cavity Mortar Control: High-Density polyethylene, nylon and recycled polyester mesh panels, trapezoidal-shaped, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
1. Manufacturers:
a. Mortar Net USA, Ltd; Product "MORTAR NET".
2. Mortar Diverter: Panels designed for installation at lintel and shelf angle flashing locations.
a. Manufacturers:
1) Advanced Building Products Inc; Mortar Break: www.advancedflashing.com.
2) Fiberweb; Product "MORTAR GUARD": www.fiberwebflashing.com

B. Weeps: Polyester mesh.
1. Manufacturers:
a. CavClear/Archovations, Inc: www.cavclear.com.
b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

C. Cavity Vents: Polyester mesh.
1. Manufacturers:
a. CavClear/Archovations, Inc: www.cavclear.com.
b. Mortar Net Solutions; Mortar Net Weep Vents: www.mortarnet.com.
c. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

E. Sealer: Acrylic copolymer in water-based solution.
   1. Manufacturer:
      a. Dayton Superior; Product: Safe Seal (J-24)
      b. Design Professional approved equivalent.
   2. Material:
      a. Appearance: Milky white liquid.
      b. Density: 8.4 lb. per gallon.
      c. Percent Solids: 15%.
      d. Film Thickness at Applied Coverage: 1 mil at 220 sq. ft. per gallon application rate.

2.08 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type S.
   2. Exterior, loadbearing masonry: Type S.
   3. Exterior, concrete masonry: Type S.
   4. Exterior, non-loadbearing masonry: Type N.
   5. Interior, loadbearing masonry: Type S.
   6. Interior, non-loadbearing masonry: Type N.

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.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.04 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.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, angle top of mortar toward the center of the units, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. Isolate masonry partitions from vertical structural framing members with a control joint.

K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 32 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls even if not shown on Drawings.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 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. Masonry reinforcement is not required in below-grade foundation walls that are backfilled on each side and in non-bearing partition walls unless noted on Drawings.

C. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

D. Place continuous joint reinforcement in first and second joint below top of walls.

E. Lap joint reinforcement ends minimum 6 inches.

F. Continue reinforcement at corners and wall intersections utilizing prefabricated "L" and "T" sections.

G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. 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. Lap joint reinforcement ends minimum 6 inches.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. 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. Lap joint reinforcement ends minimum 6 inches.

E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.11 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. 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 openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically. Place at 8 inches on center within 12 inches of jambs, heads and sills of openings.

3.12 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend stainless steel drip edges through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.

C. Extend EPDM flashings to 1/4 inch past the exterior face of masonry.
   1. Following inspection by the Design Professional, trim back the exposed flashing to the exterior face of the masonry.

3.13 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
   1. Openings to 42 inches: Place two, No. 4 reinforcing bars 1 inch from bottom web.
   2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
   3. Openings over 78 inches: Reinforce openings as detailed.
   4. Do not splice reinforcing bars.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
   6. Place and consolidate concrete without displacing reinforcing.
   7. Allow masonry lintels to attain specified strength before removing temporary supports.

C. Maintain minimum 12 inch bearing on each side of opening.

3.14 GROUTED COMPONENTS

A. Lap splices minimum 48 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening with one vertical No. 5 reinforcing bar minimum.

3.15 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joints as indicated on drawings; if not indicated, 3/4” wide and deep. Refer to Section 07 90 05 for sealant performance.

D. As work progresses, install built-in metal door frames, window frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.

E. Install built-in items plumb, level, and true to line.

F. 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.

G. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.17 CUTTING AND FITTING

A. Cut and fit for pipes, conduit, and sleeves. 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.

3.18 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests.

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.

3.19 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.20 SEALING

A. All surfaces should be cleaned with detergent recommended by sealant manufacturer and free of oil, grease, dirt, paint and other debris.

B. Sealer may be applied with low pressure airless sprayer, roller, brush or lambs wool applicator.

C. A minimum of three (3) coats shall be applied.

3.21 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 43 02

CUT STONE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cut stone accent bands.

B. Mortar and Grout.

C. Accessories.

1.02 RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry.

B. Section 07 62 00 - Sheet Metal Flashings and Trims.

C. Section 07 90 05 - Joint Sealers.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Shop Drawings: Setting and detail drawings showing dimensions, sections, jointing, anchoring, and setting number of each stone.

C. Product Data: Suppliers' catalog sheets and specifications for stone units; and catalog sheets, specifications, and installation instructions for accessories.

D. Samples:
   1. Stone: Each kind and type specified, 6 inches x 6 inches x one inch, showing quality, color range and veining, grain, and finish.
   2. Accessories: Each item and type specified.

E. Quality Control Submittals:
   1. Certificates:
      a. Qualifications: Statements certifying that the stone supplier and the installer have the specified qualifications.
      b. Stone: Statement certifying that each kind and type of stone provided for this project meets the requirements of these specifications.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Stone Supplier: Firm with 10 years of experience specializing in cutting the required kind and type of stone.
   2. Installer: Firm with 5 years of experience specializing in installing cut stone.

B. Source Quality Control: Stone of a given color range and grain shall come from a single quarry.

C. Defects:
   1. Do not use stone units with chipped arises, cracks, voids, stains, or other defects which will be visible in the finished Work.
   2. Do not patch or hide defects. Remove defective stone units from the Site.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store stone in a manner that will prevent wetting, soiling, staining, and other damage.

B. Handle stone in a manner that will prevent chipping, staining, and other damage. Use suitable lifting devices. Protect stone with suitable wood or other rigid cushioning materials.

1.06 PROJECT CONDITIONS

A. Environmental Requirements; Cold Weather Conditions:
   1. At temperatures below 40 degrees F, maintain mortar temperature between 40 degrees F and 120 degrees F. If necessary, heat mixing water and sand to produce the required results.
   2. At temperatures between 40 degrees F and 32 degrees F, protect masonry from rain and snow for 24 hours after laying.

3. At temperatures between 32 degrees F and 20 degrees F, provide wind breaks and cover the masonry to prevent wetting and freezing. Maintain masonry above freezing for not less than 24 hours using auxiliary heat or insulating blankets.
4. At temperatures below 20 degrees F, provide heated enclosures for laying the masonry. At the end of the workday, maintain the enclosures and keep the Work from freezing for not less than 24 hours.
5. Do not lower freezing point of mortar by use of antifreeze, calcium chloride or other additives.
6. Do not use frozen materials or materials coated with ice or frost.

PART 2 PRODUCTS

2.01 LIMESTONE

A. Type: Indiana Oolitic Limestone; ASTM C568, Class II.

B. Color: Grey.

C. Grade: Meet Indiana Limestone Institute of America (ILI) grade description:
1. Select.

D. Finish: Smooth; machine-planed with tool marks removed by hand.

E. Profile: As shown on drawings.

2.02 MORTAR TYPES

A. Type S: For parging and setting exterior stone masonry.

2.03 ACCESSORIES

A. Anchors: Type 302/304 stainless steel bars, 1/8 x 1-1/4 inches unless otherwise shown on the Drawings.

B. Cramps: Type 302/304 stainless steel bars, 1/8 x 1 inch unless otherwise shown on the Drawings.

C. Dowels: Type 302/304 solid stainless steel rods, not less than 3/8 inch diameter.

D. Anchor Bolts, Washers, and Nuts: Type 304 stainless steel.

E. Interior Wire Ties: 10 gage stainless steel wire.

F. Dovetail Anchor Slot Concrete Inserts: 22 gage stainless steel, with filler strip; slot sized to fit dovetail anchor. Adjustable dovetail anchors are to be stainless steel.

G. Setting Buttons/Pads: Lead.

H. Stone Cleaner: Non-staining cleaning solution which will not harm stone or mortar.

2.04 FABRICATION

A. Cut stone to the required dimensions and profiles, with surfaces finished to true planes.

B. Cut or drill to form chases, openings, reveals, reglets, and similar spaces and features shown and as required for contiguous work.

C. Cut or drill holes and sinkages for anchors, supports, fasteners, and necessary lifting devices. If possible, do not locate holes or sinkages within 2 inches of exposed surfaces.

D. Unless otherwise shown, cut stone for a uniform joint width of 1/4 inch.

E. Tolerances: Stone shall be cut within the indicated tolerances for the specified finish. In the case of optional tolerance specifications, comply with the most stringent tolerances unless otherwise indicated.
1. Limestone: Fabrication tolerances in the "ILI Handbook" by the Indiana Limestone Institute of America, Inc.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive cut stone for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.
1. Verify that required built-in anchorage items are installed in designed locations.

B. Verify that required weather barrier has been applied.

3.02 PREPARATION

A. Just prior to setting stone, clean surfaces that support the Work of this Section.

B. Clean stone before setting by scrubbing with fiber brushes, followed by a thorough drenching with clear water. Use only mild cleaning solutions that contain no harsh or caustic abrasives or fillers.

C. If stone is not wet at time of setting, drench or sponge stone with clean water except do not wet expansion joint or control joint surfaces that require sealant.

3.03 INSTALLATION

A. Install stone plumb and true to line in level courses, unless otherwise shown. Set stone in full mortar setting bed and completely fill joints, accessory sinkages, and lifting holes with mortar, except keep expansion joints, control joints, and other required cavities free of mortar.

B. Set lugged sills with ends only embedded in setting mortar. Point open joint 1 inch deep with pointing mortar.

C. Solidly build-in accessories, supports, and contiguous items of other trades unless otherwise shown or directed.

D. Set stone with 1/4 inch wide joints and beds, unless otherwise shown. If necessary, temporarily use wet wooden wedges for proper spacing.
   1. Tolerance: Maximum variation of + 1/4 of specified width.

E. After mortar has set "thumb-print" hard, rake out exposed joints 3/4 inch deep. Brush face of joints clean. Remove wooden wedges when setting bed will maintain stone in position without movement.

3.04 CLEANING

A. Clean the stone after completion of setting, pointing, and other Work liable to soil the stone.
   1. Carefully remove excess mortar and other encrusted matter.
   2. Scrub soiled surfaces of stone with mild detergent or stone cleaner and water. Use non-metallic tools.

B. Do not use any acid bearing cleaner on limestone.
   1. Remove any remaining stains by rubbing with a carborundum stone and restore the specified surface finish.
   2. Flush stone with clean water to remove any remaining residue of cleaning agent and dirt.

3.05 PROTECTION

A. Protect face materials against staining. Remove misplaced mortar immediately.

B. Protect newly laid masonry from exposure to precipitation, excessive drying, freezing, soiling, backfill, and other harmful elements.

C. Cover top of walls with non-staining, waterproof, temporary covering when work is not in progress. Protective covering shall overhang each side of wall a minimum of 2 feet and be securely anchored.

D. Protect sills, ledges, off-sets, and similar features from drippings and other damage during construction.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, support members, suspension rods, sag rods, and struts.

B. Base plates, bearing plates, shear stud connectors, deformed bar anchors, and expansion joint plates.

C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

A. Section 05 21 00 - Steel Joist Framing.

A. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

B. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

C. Section 05 40 00 - Cold-Formed Metal Framing.

D. Section 05 44 00 - Cold-Formed Metal Trusses.

E. Section 23 34 23 - HVAC Power Ventilators.

F. Section 23 63 13 - Air Cooled Refrigerant Condensers.

1.03 REFERENCE STANDARDS

A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022, with Errata (2025).

A. AISC (MAN) - Steel Construction Manual; 2023, with Errata (2026).

B. ASTM A1 - Standard Specification for Carbon Steel Tee Rails; 2000 (Reapproved 2026).

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2024.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

G. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2024.

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

I. ASTM A449 – Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use; 2014 (Reapproved 2020).

J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

K. ASTM A501/501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

L. ASTM A514/A514M - Standard Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2022.

M. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2019.

N. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (inch and Metric); 2021a.

O. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2025.

P. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.

Q. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2024.

R. 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; 2025.

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

T. ASTM D638 - Standard Test Method for Tensile Properties of Plastic; 2022.

U. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.

V. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

W. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.

X. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments; 2024.

Y. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2023.

Z. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2021.

AB. ASTM F436/F436 - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2024.

AC. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners Inch and Metric Series; 2017a.

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

AE. 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 11040 MPa Minimum Tensile Strength; 2022.

AF. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

AG. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualifications; 2021.

AH. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020 with Errata (2022).

AI. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.

AJ. ITS (DIR) - Directory of Listed Products; Current Edition.

AK. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2020.

AL. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

AM. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic); 2019.

AN. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

AO. SSPC-SP 2 - Hand Tool Cleaning; 2024.

AP. SSPC-SP 3 - Power Tool Cleaning; 2024.

AQ. SSPC-SP 5/NACE No. 1 - White Metal Blast Cleaning; 2026.

AR. SSPC-SP 6/NACE No. 3 - Commercial Blast Cleaning; 2006.

AS. SSPC-SP 7/NACE No. 4 - Brush-Off Blast Cleaning; 2007.

AT. SSPC-SP 10/NACE No. 2 - Near-White Metal Blast Cleaning; 2024.

AU. SSPC-SP 11 - Power-Tool Cleaning to Bare Metal; 2020.

AX. SSPC-SP 13/NACE No. 6 - Surface Preparation of Concrete; 2018.

AZ. UL (FRD) - Fire Resistance Directory; Current Edition.

1.02 SUBMITTALS

AA. See Construction Manager's General Requirements for submittal procedures.

BB. Shop Drawings:

1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Indicate connections for all material attached to structural steel members.
3. Indicate cambers and loads.

4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

1.03 COORDINATION

CC. Coordinate scheduling of this Work with other Contractors to assure efficient and orderly sequence of installation of interdependent construction elements.

DD. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work.

EE. Participate in meetings among Contractors, Subcontractors, Vendors, Suppliers, and Fabricators and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

1.04 QUALITY ASSURANCE

FF. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

GG. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.

HH. Fabricator: Company specializing in performing the work of this section with minimum five years of documented experience.

II. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).

JJ. Erector: Company specializing in performing the work of this section with minimum five years of documented experience.

KK. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Michigan.

PART 2 PRODUCTS

2.01 MATERIALS

LL. Steel Angles and Plates: ASTM A572 Grade 50, Fy = 50 ksi unless noted otherwise.

MM. Steel W Shapes and Tees: ASTM A992/A992M Grade 50 Fy = 50 ksi minimum.

NN. Rolled Steel Structural Shapes: ASTM A992/A992M Grade 50 Fy = 50 ksi minimum.

OO. Steel Plates and Bars: ASTM A572/A572M, Grade 50 (345) high-strength, columbium vanadium steel.

PP. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C Fy = 50 ksi minimum.

QQ. Hot-Formed Structural Tubing: ASTM A501, seamless or welded Grade B.

RR. Steel Bars: ASTM A108 Fy = 50 ksi minimum

SS. Steel Plate: ASTM A514/A514M.Fy = 100 ksi.

TT. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.

UU. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.

VV. Sag Rods: ASTM A36/A36M.

WW. Non-Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A153/A153M, Class C.

XX. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325/ASTM A325M (ASTM F3125), Type 1, medium carbon with matching ASTM A563/ASTM A563M nuts and ASTM F436 washers.

YY. Unheaded Anchor Rods: ASTM F1554, Grade 55, plain, with matching ASTM A563/A563M nuts and ASTM F436 Type 1 washers.

ZZ. Load Indicator Washers: Provide washers complying with ASTM F959 at all connections requiring slip-critical high-strength bolts.

AAA. Welding Materials: AWS D1.1; type required for materials being welded.

BBB. Sliding Bearing Plates: Teflon coated.

CCC. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107/C1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

DDD. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

EEE. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

FFF. Shop fabricate to greatest extent possible.

GGG. Space shear stud connectors at spacing given on plans but not less than 12” c/c.

HHH. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

III. Fabricate connections for bolt, nut, and washer connectors unless shown otherwise on the drawings.

JJJ. Develop required camber for members.

KKK. Grind welds smooth at areas exposed to view in the finished project and within 12 feet of where occupants will have access. Other welds in exposed areas shall be neat in appearance (resembling a cascaded stack of dimes) and shall have spatter removed.

2.03 FINISH

LLL. Prepare structural component surfaces in accordance with SSPC SP 3 for non-architecturally exposed structural steel. At AESS provide SSPC SP 5 white metal blast cleaning.

MMM. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or the faying surfaces of high strength bolted connections.

NNN. Galvanize structural steel members exposed to weather in the finished project to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating. Prepare for painting after galvanizing where required by Design Professional.

2.04 SOURCE QUALITY CONTROL

OOO. Provide shop testing and analysis of structural steel.

PPP. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts" (ASTM F3125), testing at least 5 percent of bolts at each connection.

QQQ. Welded Connections: Visually inspect all shop-welded connections and test at least 5 percent of welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165.
4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.01 EXAMINATION

RRR. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

SSS. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

TTT. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

UUU. Field weld components and shear studs indicated on shop drawings.

VVV. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 (ASTM F3125) Bolts.

WWW. Do not field cut or alter structural members without approval of Design Professional.

XXX. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

1. At galvanized steel touch-up with galvanizing repair coating.

YYY. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

ZZZ. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

AAAA. Maximum Offset from True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

BBBB. An independent testing agency will perform field quality control tests, as specified in Section 01 10 00.

CCCC. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 (ASTM F 3125) Bolts", testing at least 5 percent of bolts at each connection.

DDDD. Welded Connections: Visually inspect all field-welded connections and test at least 5 percent of welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165.
4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 05 21 00

STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Open web steel joists, joist bridging, attached seats and anchors.

B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.

C. Supplementary framing for floor and roof openings greater than 12 inches.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.

B. Section 05 31 00 - Steel Decking: Bearing plates and angles.

C. Section 05 50 00 - Metal Fabrications: Non-framing steel fabrications attached to joists.

D. Section 23 34 23 - HVAC Power Ventilators.

E. Section 23 63 13 - Air Cooled Refrigerant Condensers.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2024.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

E. ASTM E94/E94M - Standard Guide for Radiographic Examination; 2017.

F. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2024.

G. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2023.

H. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2021.

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

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).

K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2019.

L. SJI 100 - Standard Specifications for K-Series, LH-Series and DLH-Series Open Web Steel Joists and for Joist Girders; 2025.

M. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2025.

N. SSPC-Paint 15 – Steel Joist Shop Primer/Metal Building Primer; 2004.

O. SSPC-Paint 20 – Zinc-Rich Coating (Type I – Inorganic and Type II – Organic); 2019.

P. SSPC-SP 2 - Hand Tool Cleaning; 2024.

Q. SSPC-SP-3 - Power Tool Cleaning; 2024.

R. UL (DIR) - Online Certifications Directory; Current Edition.

S. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, special seats, locations of joists, joist leg extensions, bridging, connections, and attachments. Provide plan of erection showing location of all members and all required attachment to other work.

1.05 COORDINATION

A. Coordinate scheduling of this Work with other Contractors to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work.

C. Participate in meetings among Contractors, Subcontractors, Vendors, Suppliers, and Fabricators and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

1.06 QUALITY ASSURANCE

A. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Michigan.

B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI Standard Specifications Load Tables and SJI Technical Digest No.9.

C. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

D. Erector Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Joists:
   1. Canam Group Inc: www.canam-steeljoists.ws
   2. New Millenium Building Systems: www.newmill.com.
   3. Nucor-Vulcraft Group: www.vulcraft.com.

2.02 MATERIALS

A. Open Web Joists: SJI Type K Joists:
   1. Provide bottom chord extensions as indicated.
   2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
   3. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
   4. Finish: Shop primed.

B. Anchor Bolts, Nuts and Washers: ASTM F3125 FY=120 KSI minimum.

C. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

D. Structural Steel for Supplementary Framing and Bridging: ASTM A36/A36M.

E. Welding Materials: AWS D1.1; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Drill holes in chords for attachment of suspended and supported items where indicated.

B. Frame special sized openings in joist web framing as detailed.

C. Camber joists to remove dead load deflection.

2.04 FINISH

A. Prime paint joists as specified.

B. Prepare surfaces to be finished in accordance with SSPC-SP 3.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.

D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

E. Position and attach joist chord bridging and wall attachments as detailed.

F. Install supplementary framing for roof openings greater than 12 inches.

G. Do not permit erection of decking until joists are braced bridged and secured or until completion of erection and installation of permanent bridging and bracing.

H. Do not field cut or alter structural members without approval of joist manufacturer.

I. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed, except surfaces specified not to be primed.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch.

B. Maximum Offset from True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 10 00.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 (ASTM F3125) Bolts", testing at least 5 percent of bolts at each connection.

C. Welded Connections: Visually inspect all field-welded connections and test at least 5 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof deck.

B. Supplementary framing for openings up to and including 18 inches.

C. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

A. Section 04 20 00 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.

B. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 12 inches and shear stud connectors.

C. Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 12 inches and shear stud connectors.

D. Section 23 34 23 - HVAC Power Ventilators.

E. Section 23 63 13 - Air Cooled Refrigerant Condensers.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2024.

C. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

D. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2025.

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

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2024.

G. ASTM E384 – Standard Test Method for Microindentation Hardness of Materials; 2022.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).

I. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).

J. FM (AG) - FM Approval Guide; Current Edition.

K. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2026).

L. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2022).

M. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2019.

N. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; ICC Evaluation Service, Inc.; 2022.

O. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2019, with Editorial Revision (2021).

P. ITS (DIR) – Directory of Listed Products; Current Edition.

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

R. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, Roof Decks; 2007.

S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

T. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic); 2019.

U. UL (DIR) - Online Certifications Directory; Current Edition.

V. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 STEEL DECK MANUFACTURER AND CONTRACTOR QUALIFICATIONS

A. The Manufacturer and the Steel Deck Erector (“Erector”) shall each demonstrate a minimum of ten (10) years of experience with the specified steel deck systems.

B. The Erector shall use prequalified welding processes in accordance with the AWS Structural Welding Code and shall provide certification that those welders to be employed in the Work are currently qualified for those processes and have satisfactorily passed the applicable AWS qualification tests.

C. Contractor’s Engineer shall be qualified to perform the type of work required by the project. The Engineer shall be a Structural Engineer licensed in the state where the project is located. The Contractor’s Engineer shall have 10 years of experience in responsible charge of work of this nature, on steel deck installations similar to this Project in material, design, and extent, with a record of successful in-service performance. Proposed Contractor’s Engineer shall be subject to approval of Design Professional and Owner.

1.05 SUBMITTALS

A. See Construction Manager's General Conditions for submittal procedures.

B. Product Certificates: For each type of steel deck.

C. Shop Drawings:
   1. Deck types (profiles), steel gauges, and deck finishes.
   2. Deck layout, including panel locations, number of deck spans per panel, structural support locations, joint locations, and locations of acoustical vs non-acoustical decking.
   3. Deck dimensions and sections keyed to layout plans, including side and end details and bearing requirements.
   4. Deck fastener types (welds, screws, pins, proprietary systems) and layout patterns at panel sides, ends and interior supports.
   5. Deck manufacturer, profiles, properties, vertical load capacity and in-plane diaphragm shear capacity for all as-detailed conditions.
   6. Details and locations of accessories including hardware, framing reinforcement anchorage, sump pans, cant strips, ridge plates, valley plates and closure plates.
   7. Fabrication necessary to incorporate steel deck into the job.
   8. Correlation with other requirements, openings and flashings.
   9. Contractor-coordinated openings for mechanical, electrical, plumbing, fire protection and other trades.
   10. The Contractor shall have reviewed and approved the shop drawings prior to submission to the Design Professionals for their review, representing that the Contractor has verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog number and similar data with respect thereto and reviewed or coordinated each drawing and sample with the work of other trades and with the requirements of the project and the Contract Documents.

D. Manufacturer’s Certification
   1. Submit for record a letter of certification from the deck manufacturer stating that the design, the detailing and fabrication of the steel deck to be installed under this Section are in accordance with the SDI Design Manual for Roof Decks.

E. Manufacturer’s Installation Instructions
   1. Submit for record Manufacturer’s literature providing recommended installation instructions.

F. Welder Certifications
   1. Submit for record welder certificates signed by the Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

1.06 COORDINATION

A. Coordinate scheduling of this Work with other Contractors to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work.

C. Participate in meetings among Contractors, Subcontractors, Vendors, Suppliers, and Fabricators and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

1.07 QUALITY ASSURANCE

A. Owner's Testing & Inspection Agency
   1. Reports: The Testing Agency shall include in the daily reports of the structural steel, steel deck progress and description/area of work, tests made and results.
   2. Coordination: The Contractor shall have sole responsibility for coordinating his work with the Testing Agency to assure that all test and inspection procedures required by the Contract Documents and/or Public Agencies, are properly provided. The Contractor shall cooperate fully with the Testing Agency in the performance of their work.

B. Field Inspection:
   1. All steel deck shall be inspected after erection to ascertain the following relative to approved shop drawings:
      a. Deck profile, type (acoustic, cellular, vented), gage and finish.
      b. Deck orientation, alignment, bearing and laps (if applicable).
      c. Supplementary items including secondary supports, closures, pour stops, sumps and their connections to deck and to other members.
      d. Damage of members during transportation, storage and erection.
      e. Installation for proper erection.
      f. Connections (for quantity, size and spacing, and quality of welds) including inspection of deck welding and/or mechanical fastening.

C. Testing Agency Reports & Certifications:
   1. Indicate to the Contractor where remedial work must be performed. Track and retest all locations of remedial work.
   2. Upon completion of work and resolution of remedial items, certify in a letter to the Design Professionals and Owner that the installation is in accordance with the design and Specification requirements (including applicable codes).

1.08 DELIVERY, STORAGE, AND HANDLING

A. Do not bend or mar decking.

B. Store off ground with one end elevated for drainage.

C. Cut plastic wrap to encourage ventilation.

D. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

E. Do not store deck bundles on framing unless material is securely tied down and the framing has been analyzed to ensure that such storage will not cause an overload.

PART 2 PRODUCTS

2.01 GENERAL

A. All steel deck units shall be of the same depth and profile as shown on the Drawings and the product of one manufacturer.

2.02 DESIGN

A. Section properties of the steel deck units shall be calculated in accordance with the AISI "Specification for the Design of Cold-Formed Steel Structural Members". The minimum positive and negative section moduli so obtained shall be used in calculations involving positive and negative moments, respectively, in determining the required gauges of steel deck units.

B. Where indicated on Drawings or Structural General Notes, the Contractor's Engineer shall design the steel deck using the load criteria shown on the Drawings and the design criteria specified herein.

C. The Contractor's Engineer shall be responsible for determining the suitability of single, double and multiple span lengths of decking for analysis under service and construction conditions.

D. Design of steel deck not receiving concrete fill:
   1. Resist design loads using bare steel deck properties. Consider both construction loads and specified loads.

2. Use three span continuous layouts wherever possible.

2.03 MANUFACTURERS

A. Steel Deck:
   1. Canam Steel Corporation: www.canam-steeljoists.ws.
   2. Cordeck, Inc: www.cordeck.com.
   3. New Millennium Building Systems, LLC: www.newmill.com.
   4. Nucor-Vulcraft Group: www.vulcraft.com.

2.04 STEEL DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural working stress design and structural properties specified.
   2. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
   3. Maximum Lateral Deflection of Diaphragms: 1/500 of the height of the wall.

B. Roof Deck: Non-composite type, steel sheet with plain vertical flutes at 3 inch type N deck and angled side flutes at 1.5 inch type WR deck.
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230 minimum, with G90/Z275 galvanized coating.
      a. Grade as required to meet performance criteria.
   2. Structural Properties:
      a. Span Design: triple span.
   3. Minimum Metal Thickness, Excluding Finish: 16, 18, and 20 gage as noted on the plans.
   4. Nominal Height: 1-1/2 inch and 3 inch as noted on the drawings.
   5. Profile: Fluted; SDI type B Wide Rib at 1.5 inch deep decks and type N at 3 inch deep decks.
   6. Formed Sheet Width: 24 inch, 32 inch or 36 inch.
   7. Side Joints: Lapped, welded or screwed.
   8. End Joints: Lapped, welded or screwed.

2.05 MATERIALS

A. Prime Painted Cold Rolled Steel Sheet for deck and accessories:
   1. ASTM A1008 SS Grade 33 (minimum) with minimum yield strength of 33ksi.

B. Galvanized Steel:
   1. Roof steel deck and all closures and flashings shall be formed from steel sheets conforming to ASTM A653, Structural Quality Grade 33 (minimum) with minimum yield strength of 33 ksi. Before forming, the steel sheet shall be coated with a zinc coating conforming to ASTM A653 Zinc coated per ASTM A653 G-90 for roof deck and accessories.

C. All steel decking shall be roll formed for uniformity in dimension and strength.

D. Roof decking shall be classified by Underwriters' Laboratories, Inc. Each unit or bundle shall be labeled and marked as required by UL, indicating manufacturer, testing, and inspection.

2.06 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.

B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.

C. Welding Materials: AWS D1.1.

D. Fasteners: Galvanized hardened steel, self tapping.

E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
   1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI design method for roof deck and floor deck applications and ICC-ES AC43.
   2. Material: Steel; ASTM A510/A510M, Grade 1077.
      a. Hardness: Rockwell C 54.5, minimum.
      b. Tensile Strength: 285 kips per square inch, minimum.
      c. Shear Strength: 175 kips per square inch, minimum.
      d. Washers:
         1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.

2) Roof Deck Applications: 0.591 inch diameter, minimum.

e. Corrosion Resistance:
1) Steel Bar Joist Framing Applications: ASTM B 633, SC1, Type III zinc electroplate..
2) Roof Deck Applications: Provide manufacturer's standard stainless steel sealing caps with bonded neoprene washer over each fastener.

3. Products:
a. Simpson Strong-Tie; XQ114S1224: www.strongtie.com.

F. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI design method for roof deck and floor deck applications and ICC-ES AC43.
2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B 633, SC1, Type III zinc electroplate.
3. Fasteners for Exposed Steel Roof Deck Application: Manufacturer's standard stainless steel with bonded neoprene washer.
4. Products:
a. ITW Commercial Construction North America; ITW CCNA-Buildex Teks Select Series: www.ITWBuildex.com.

G. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

H. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

J. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.07 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage thick sheet steel; of profile and size as indicated; finished same as deck.

B. Cant Strips: Formed sheet steel, 18 gage thick, 45 degree slope, 3 1/2 inch nominal width and height, flange for attachment.

C. Roof Sump Pans: 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

A. Work by Others: Examine all work prepared by others to receive work of this Section, especially plan and elevation locations of supporting frames and walls. Report any defects affecting installation to Design Professional. The Contractor alone shall be responsible for checking the dimensions and coordination of the steel deck work with other trades. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Do not place deck units on supports with debris or unapproved coatings that could affect full, level bearing and proper connections.

C. Coordinate the location of decking bundles with a structural steel erector to prevent overloading of structural members.

3.02 ERECTION – PLACEMENT

A. Erect steel deck in accordance with the decking manufacturer’s recommendations and the requirements of the Drawings and these Specifications.

B. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No.31, manufacturer’s written instructions, and requirements in this Section.

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

D. Locate deck bundles to prevent overloading of supporting members.

E. Place steel deck on the supporting framework and adjust to final position with ends accurately aligned and bearing on supporting members before making permanent connections. Do not stretch or contract sidelap interlocks.

F. Place deck units flat, square, without warping or excessive deflections, in straight alignment for entire length of run of cells and with close alignment between the cells at ends of abutting units.

G. Abutting ends of deck panels shall occur over supports. End bearing shall be a minimum of 2 inches, or greater if required (web crippling) by deck manufacturer.

H. Where deck panels nest, laps shall be a minimum of 2" and shall occur over supports. Nesting is permitted only where profiles are designed to nest and are fabricated with offset ends.

I. Install slab edge closures and pour stops at the theoretical position with maximum tolerance of + 3/8". Closures and pour stops shall have adequate adjustments to maintain this tolerance while accommodating the structural steel frame tolerances.

3.03 ERECTION – CONNECTIONS

A. Connect steel deck to the steel framework at ends of units and at intermediate supports as shown on the Contract Documents and approved shop drawings.

B. Deck to support welds shall be puddle welds of diameter and spacing shown on Contract Documents and/or approved shop drawings.

C. Use welding washers for puddle welding at deck thinner than 22 gauge and where recommended by the manufacturer.

D. Fasten side laps and perimeter edges of panels between supports by, side seam welding or screws, or as noted on Construction Drawings.

3.04 ERECTION – OPENINGS AND CLOSURES

A. Contractor to coordinate location of all openings with other trades.

B. Cut and install sleeves and holes through decking for openings indicated on the Architectural, Structural, and/or Mechanical-Electrical-Plumbing-Fire Protection Drawings. Sleeves will be furnished by the various trades requiring them. Provide and install reinforcement as required around sleeves.

C. Provide miscellaneous headers and other steel reinforcing and supports welded to decking and structural steel as required at penetrations, around columns, etc. per typical details and manufacturer's recommendations.

D. Field cutting parallel to flutes shall be done in the low flutes, taking care to leave sufficient horizontal material to permit satisfactory welding of deck to supporting steel.

E. Openings required for work of other trades and not indicated on Architectural / Structural / Mechanical / Electrical / Plumbing / Fire Protection / Telecom Drawings shall be permitted only upon approval of the Design Professionals as to size and location.

F. Furnish and install tight-fitting closures at locations including but not limited to:
   1. Open ends of flutes and sides of decking (neoprene or sheet steel)
   2. Open ends of all flutes at columns, walls and openings shown on Contract Drawings
   3. Panel ends where panels change direction or abut (sheet steel or closure tape)
   4. Between deck units and columns (sheet steel).
   5. Between columns and exterior cladding (sheet steel).
   6. Welding hole cover, with friction fastening, to close excess holes when required (sheet steel).

3.05 WELDING

A. Welding of steel deck shall follow the technique outlined by the steel deck manufacturer.

3.06 ROOF SUMP PANS

A. Place over openings provided in roof decking and weld to top decking surface. Space welds or screws not more than 12 inches o.c. with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size shown, coordinate with Plumbing Drawings.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall framing.

1.02 RELATED REQUIREMENTS

A. Section 05 31 00 - Steel Decking.

B. Section 05 44 00 - Cold-Formed Metal Trusses.

C. Section 06 10 00 - Rough Carpentry: Wall sheathing, wood blocking and miscellaneous framing.

D. Section 07 21 00 - Thermal Insulation: Insulation within framing members.

E. Section 07 25 00 - Weather Barriers: Weather barrier over sheathing.

F. Section 07 90 05 - Joint Sealers.

G. Section 09 21 16 - Gypsum Board Assemblies: Cold-formed steel nonstructural framing and Gypsum-based sheathing.

H. Section 09 51 00 - Acoustical Ceilings: Ceiling suspension system.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.

F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

H. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on cold-formed steel structural members; include material descriptions and base steel thickness.

C. Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.

D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud and roof framing layout.
   2. Describe method for securing studs to tracks and for bolted framing connections.
   3. Indicate method of attachment of walls to roof structure to resist in-plane shear, out of-plane shear, and uplift due to wind and racking.

E. Design Data:
   1. Shop drawings signed and sealed by a professional structural engineer.

2. Design calculations sufficient to demonstrate compliance with design criteria; signed and sealed by a professional structural engineer registered in the State of Michigan.
3. Details and calculations for factory-made connectors, signed and sealed by a professional structural engineer registered in the State of Michigan.

F. Inspection Reports: Provide material verification Inspection Reports in accordance with requirements of AISI S240.

G. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention, including installation instructions for connectors.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Michigan.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Structural Framing:
1. ClarkDietrich: www.clarkdietrich.com.
2. MarinoWARE: www.marinoware.com.
3. The Steel Network, Inc: www.SteelNetwork.com.

B. Connectors:
1. Same manufacturer as metal framing.
2. Simpson Strong Tie: www.strongtie.com.

2.02 PERFORMANCE REQUIREMENTS

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Design Requirements: Design complete cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ASCE 7, applicable building code, AISI S100, and AISI S240.

C. Design Criteria: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
1. Roof Live Loads:
   a. Minimum Uniformly Distributed:
      1) Floyd Elementary: 29.4 psf snow load and 15 psf dead load.
      2) Pine River Elementary: 24.5 psf snow load and 15 psf dead load.
   b. Minimum Concentrated: 300 lbs.
2. Live Load Deflection meeting the following, and as shown on Drawings:
   a. Roofs: Maximum vertical deflection = span/240 total load and span/360 live load.
   b. Exterior Walls: Maximum horizontal deflection under wind load of 1/360 of span typical except 1/600 if supporting masonry veneer.
   c. Design nonaxial loadbearing framing to accommodate not less than 3/4 inch vertical deflection.
   d. Provide for 25 psf net minimum uplift on canopy roofs and overhangs.
3. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
4. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

D. Fabrication:
1. Shop-fabricate cold-formed framing system to the greatest extent possible.
2. Deliver to site in largest practical sections.

2.03 MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

2.04 STRUCTURAL FRAMING COMPONENTS

A. Wall Studs and Track Sections: AISI S240; c or “Sigma” -shaped studs with punched webs and u-shaped track sections in stud-matching nominal width and compatible height.
   1. Structural Grade: As required to meet design criteria.
   2. Gage and Depth: As required to meet specified performance levels with minimum 18 gage minimum or as given on the drawings.
   3. Stud Depth: As indicated on the drawings and as required by calculation.
   4. Galvanized in accordance with ASTM A653/A653M G90/Z275 coating.
   5. Provide components fabricated from ASTM A1008/A1008M, Designation SS steel.

2.05 CONNECTIONS

A. Performance Requirements: Provide connections in compliance with requirements of AISI S240.

B. Structural Performance: Maintain load and movement capacity required by applicable building code and specified design criteria.

C. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on Drawings.
   1. Where continuous studs bypass spandrel beams, connect stud to beams in manner allowing vertical and horizontal movement of structure without affecting studs; allow for minimum movement of 1/2 inch.
   2. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of structure without affecting studs; allow for minimum movement of 1/2 inch.
   3. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on Drawings; minimum track length of 12 feet.
   4. Provide top track with long leg track and head of wall movement connectors; minimum track length of 12 feet.

D. Fixed Connections: Provide nonmovement devices for tie-down to foundation, Simpson S/LTTP2 with 1/2 inch diameter anchor bolt and (12) #10 screws to stud.

E. Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connectors where indicated on the Drawings.
   1. Products: Connectors by Simpson Strong Tie or similar of equal capacity by the stud manufacturer.

2.06 MISCELLANEOUS CONNECTIONS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
   1. Products:
      a. ITW Commercial Construction North America; ITW CCNA-Buildex Teks Select Series: www.ITWBuildex.com.

B. Anchorage Devices: Powder actuated.

C. Welding: In conformance with AWS D1.1/D1.1M.

2.07 SHEATHING

A. Wall Sheathing: See Section 06 10 00 - Rough Carpentry.

2.08 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.

C. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

F. Air Barrier: As specified in Section 07 27 00.

PART 3 EXECUTION

3.01 3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION - GENERAL

A. Install structural members and connections in compliance with AISI S240.

3.03 INSTALLATION OF STUDS

A. Install wall studs plumb and level. Anchor wall framing of mansard roof walls to cementitious roof deck to resist calculated uplift and shear forces.

B. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

C. Install load wall studs full length in one piece. Splicing of studs is not permitted.

D. Install load wall studs, brace, and reinforce to develop full strength and achieve design requirements.

E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

F. Install intermediate studs above and below openings to align with wall stud spacing.

G. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

H. Attach cross studs to studs for attachment of fixtures anchored to walls.

I. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

J. Touch-up field welds and damaged galvanized surfaces with primer.

3.04 INSTALLATION OF WALL SHEATHING

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
   1. Use plywood or other acceptable structural panels at least 32 inches wide at building corners, measured horizontally.
   2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.05 FIELD QUALITY CONTROL

A. See Construction Manager's General Requirements for additional requirements.

B. Provide material verification inspections in accordance with requirements of AISI S240.

C. Provide inspections for welding, mechanical fastening, and cold-formed steel light-frame construction in accordance with requirements of AISI S240.

3.06 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation of any Member from Plane: 1/4 inch.

END OF SECTION

SECTION 05 44 00

COLD-FORMED METAL TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Light gauge cold-formed steel roof trusses.

B. Anchorages, bracing, and bridging.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing.

B. Section 05 21 00 - Steel Joist Framing: Structural steel open-web joists and joist girders.

C. Section 05 40 00 - Cold-Formed Metal Framing: Light gauge structural metal studs.

D. Section 06 10 00 - Rough Carpentry: Roof sheathing.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

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

C. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.

D. AWS D1.1/D1.1M - Structural Welding Code- Steel; 2020, with Errata (2022).

E. AWS D1.3/D1.3M - Structural Welding Code- Sheet Steel; 2018, with Errata (2022).

F. CFSEI 5000 - Field Installation Guide for Cold-Formed Steel Roof Trusses; May 2000.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Meet at project site prior to beginning of installation to review requirements. Require attendance by representatives of the following:
   1. Truss fabricator.
   2. Truss installer.
   3. Other entities affected by the work of this section, including but not limited to truss support framing installer, mechanical systems installer, and electrical systems installer.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Span charts.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Include detailed roof truss layout.
   2. Show member type, location, spacing, size and gauge, methods of attachment, and erection details. Indicate supplemental bracing, strapping, splices, bridging, and accessories.
   3. Include truss design drawings, signed and sealed by a qualified professional engineer registered in the State of Michigan, verifying ability of each truss design to meet applicable code and design requirements.
      a. Include the following:
         1) Design criteria.
         2) Engineering analysis depicting member stresses and deflections.
         3) Member sizes and gauges.
         4) Details of connections at truss joints.
         5) Truss support reactions.
         6) Bracing requirements.

7) Truss anchorage to structural steel frame.

D. Steel Framing Industry Association (SFIA) Certification:
   1. Submit documentation that metal studs and connectors used on project meet or exceed requirements of International Building Code.
   2. Submit current documentation of contractor accreditation and installer certification. Keep copies of each on-site during and after installation, and present upon request.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Michigan.

B. SFIA Code Compliance Certification Program: www.CFSteel.org: Use metal studs and connectors certified for compliance with International Building Code.

C. Professional Contractor and Truss Fabricator Qualifications: SFIA-accredited contractor and fabricator: www.CFSteel.org.

D. Fabricator Qualifications: Steel truss fabricator with minimum 10 years of experience designing and fabricating truss systems equivalent to those required for this project and licensed by an acceptable manufacturer.

E. Installer Qualifications: Experienced installer approved by truss system fabricator.

F. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.

G. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver trusses and other materials in manufacturer's unopened bundles or containers, each marked with manufacturer's name, brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.

B. Store trusses on blocking, pallets, platforms, or other supports, off the ground and in an upright position, sufficiently braced to avoid damage from excessive bending. Gently slope stored trusses to avoid accumulation of water on interior of truss chord members.

C. Protect trusses and accessories from contact with earth, corrosion, deformation, mechanical damage, or other deterioration when stored at project site.

PART 2 PRODUCTS

2.01 TRUSS DESIGN REQUIREMENTS

A. Design: Calculate structural characteristics of cold-formed steel truss members according to AISI S100.

B. Structural Performance: Design, engineer, fabricate, and erect trusses to withstand specified design loads for project conditions within required limits.
   1. Design Loads: As indicated on Drawings.
   2. Deflections: Live load deflection meeting the following, unless otherwise indicated:
      a. Roofs: Maximum vertical deflection under live load of 1/240 of span.
   3. Design trusses to accommodate movement attributable to temperature changes within a range of 120 degrees F without damage or overstressing, sheathing failure, undue strain on fasteners and anchors, or other deleterious effects.

2.02 COMPONENTS

A. Trusses: Light gauge steel assemblies providing a complete horizontal framing system for locations indicated, ready for deck installation.
   1. Truss Type, Span, and Height: As indicated on drawings.
   2. Chord and Web Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 40,000 psi; minimum G60/Z180 coating; gauges as required for load conditions; all edges rolled or closed.

B. Fasteners: Self-drilling, self-tapping screw fasteners with corrosion-resistant plated finish, as recommended by steel truss manufacturer and marked for easy identification.
   1. Welding: Comply with applicable provisions of AWS D1.1/D1.1M and AWS D1.3/D1.3M.

C. Bracing, Bridging, and Blocking Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 33,000 psi; minimum G60/Z180 coating; gauges as required for load conditions.

2.03 FABRICATION

A. Factory fabricate cold-formed steel trusses plumb, square, and true to line, and with secure connections, complying with manufacturer's recommendations and project requirements.
   1. Fabricate trusses using jigs or templates.
   2. Cut truss members by sawing or shearing; do not torch cut.
   3. Fasten members in full compliance with instructions of manufacturer. Wire tying of framing members is **NOT** permitted.

B. Tolerances: Fabricate trusses to maximum allowable tolerance variation from plumb, level and true line of 1/8 inch in 10 feet.
   1. Up to 30 feet Long: Maximum plus or minus 1/4 inch from design length.
   2. Over 30 feet Long: Maximum plus or minus 1/2 inch from design length.
   3. Up to 5 feet High: Maximum plus or minus 1/4 inch from design height.
   4. Over 5 feet High: Maximum plus or minus 1/2 inch from design height.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine structure, substrates, and installation conditions. Notify Design Professional of unsatisfactory preparation. Do not begin installation until substrates have been properly prepared and unsatisfactory conditions have been corrected.

B. Proceeding with installation indicates installer’s acceptance of substrate conditions.

3.02 INSTALLATION

A. Install cold-formed steel trusses in strict accordance with manufacturer's instructions and approved shop drawings, using approved fastening methods.

B. Install temporary erection bracing and permanent bracing and bridging before application of any loads. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at spacing indicated. Anchor trusses securely at bearing points.

C. Adequately distribute applied loads to avoid exceeding the carrying capacity of any one joint, truss, or other component.

D. Exercise care to avoid damaging truss members during lifting and erection and to minimize horizontal bending of trusses.

E. Removal, cutting, or alteration of any truss chord, web, or bracing member in the field is prohibited, unless approved in advance by Design Professional or the engineer of record and the truss manufacturer.

F. Repair or replace damaged members and complete trusses as directed and approved in writing by Design Professional or the engineer of record and the truss manufacturer.

G. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

H. Roof Trusses:
   1. Comply with recommendations of CFSEI 5000.
   2. Install continuous bridging and permanent truss bracing as indicated.
   3. Install roof cross bracing and diagonal bracing as indicated.

3.03 TOLERANCES

A. Install trusses to maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

B. Space individual trusses not more than plus or minus 1/8 inch from plan location. Cumulative error in placement may not exceed minimum fastening requirements of sheathing or other material fastened to trusses.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: An independent testing agency will perform perform tests and inspections.

3.05 PROTECTION

A. Protect trusses from damage by subsequent construction activities.

B. Repair or replace damaged trusses, truss members, and bracing members; obtain approval in advance by Design Professional or the engineer of record and the truss manufacturer for all cutting, repairs, and replacements.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items, including but not necessarily all items:
   1. Miscellaneous floor and roof openings.
   2. Shower bench supports.
   3. Lintels.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.

D. Section 05 21 00 - Steel Joist Framing: Structural joist bearing plates, including anchorage.

E. Section 05 31 00 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.

F. Section 09 90 00 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2024.

B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

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

H. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

I. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire; 2019.

J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021e1.

K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2021.

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

M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

N. AWS D1.1/D1.1M - Structural Welding Code – Steel; 2020, with Errata (2022).

O. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

P. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.

Q. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

R. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

S. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Construction Manager's General 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.

C. Product Data: Submit manufacturer's information for bollard sleeves including standard colors, dimensions and profiles.

1.05 COORDINATION

A. Coordinate scheduling of this Work with other Contractors to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work.

C. Participate in meetings among Contractors, Subcontractors, Vendors, Suppliers, and Fabricators and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

1.06 QUALITY ASSURANCE

A. Design under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Michigan.

B. Fabricator Qualifications: A qualified fabricator that is accredited by IAS AC172

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A992 or A572 Grade 50.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

G. Anchor Bolts: ASTM F1554, Grade 55, hot-dipped galvanized finish where expose on the exterior.
   1. Each bolt to include hex nut and flat washer.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 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.

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.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Ledge Angles, Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking, joists and masonry; prime paint finish, except hot dipped galvanized if built into exterior wall or exposed to weather.

B. Lintels: As detailed; prime paint finish, except hot dipped galvanized if built into exterior wall.

C. In addition to lintels noted on Drawings, provide lintels at masonry openings required for work of all trades.
   1. Lintels shall be typically 12 inches longer than width of opening.
   2. Where lintel abuts steel or concrete structural element, weld a 5/16 inch thick plate to end of lintel. Weld plate to steel or anchor to concrete as required.
   3. Lintels not sized on Drawing shall comply with the following:
      a. For each 4 inch width of masonry at openings:
         1) Up to 4'-0": One 3-1/2" x 3-1/2" x 5/16" angle
         2) 4'-0" to 6'-4": One 5" x 3-1/2" x 5/16" angle LLV
         3) 6'-4" to 8'-0": One 6" x 3-1/2" x 5/16" angle LLV
         4) Over 8'-0": Structural lintel required.

D. Aluminum Bench Supports:
   1. Sizes: as detailed on Drawings.
   2. Finish: Powder coating.

2.05 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exceptions: Galvanize items to be embedded in concrete, items to be imbedded in masonry, and items specified for galvanized finish.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FINISHES - ALUMINUM

A. Pigmented Organic Coating System: AAMA 2603 polyester or acrylic baked enamel finish; color as scheduled.

B. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.07 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

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 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.

3.03 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.

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 or galvanized, except surfaces to be in contact with concrete.

3.04 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

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-structural dimension lumber framing.

B. Rough opening framing for doors, windows, and roof openings.

C. Sheathing.

D. Roofing nailers.

E. Roofing cant strips.

F. Preservative treated wood materials.

G. Fire retardant treated wood materials.

H. Concealed wood blocking, nailers, and supports.

I. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.

B. Section 07 27 00 - Air Barriers: Air barrier over sheathing.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2022.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

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

D. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.

E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

F. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).

G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rates of Materials; 2024a.

J. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024 with Errata.

K. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.

L. PS 1 - Structural Plywood; 2023.

M. PS 2 - Performance Standard for Wood Structural Panels; 2019.

N. PS 20 - American Softwood Lumber Standard; 2021.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.05 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.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Roof Sheathing: Any PS 2 type, rated Structural I Sheathing.
   1. Bond Classification: Exterior.
   2. Span Rating: 60.
   3. Performance Category: 3/4 PERF CAT.

B. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, square long edges, 5/8 inch Type X fire-resistant.
   1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Edges: Square, for vertical application.
   4. Glass Mat Faced Products:
      a. CertainTeed Corporation; GlasRoc Brand.
      b. Georgia-Pacific Gypsum; DensGlass Sheathing.

C. Other Applications:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
   3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

B. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

2.05 FACTORY WOOD TREATMENT

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.
   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 AWPA standards.

B. Fire Retardant Treatment:

1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
    a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    b. Do not use treated wood in direct contact with the ground.
2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    b. Treat rough carpentry items as indicated.
    c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    a. Treat lumber exposed to weather.
2. Treat lumber in contact with roofing, flashing, or waterproofing.
3. Treat lumber in contact with masonry or concrete.
4. Treat lumber less than 18 inches above grade.
    a. Treat lumber in other locations as indicated.
5. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
    a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
    b. Treat plywood in contact with roofing, flashing, or waterproofing.
    c. Treat plywood in contact with masonry or concrete.
    d. Treat plywood less than 18 inches above grade.
    e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

B. Coordinate installation of rough carpentry members specified in other sections.

3.02 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.

3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Specifically, provide the following non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Grab bars.
   4. Towel and bath accessories.
   5. Wall-mounted door stops.
   6. Tackboards and marker boards.

3.04 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.05 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges use sheathing clips where joints occur between roof framing members.
   2. At long edges provide solid edge blocking where joints occur between roof framing members.
   3. Nail panels to framing; staples are not permitted.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
   1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches, measured horizontally.
   2. Provide inlet diagonal bracing at corners.
   3. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.06 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.07 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.

3.08 CLEANING

A. Waste Disposal: Comply with the General Requirements.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Installation of door hardware.

C. Installation of toilet accessories.

D. Solid Surfacing.

E. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shower bench supports.

B. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

C. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.

D. Section 08 14 16 - Flush Wood Doors.

E. Section 08 71 00 - Door Hardware.

F. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.

G. Section 10 28 00 - Toilet, Bath and Laundry Accessories.

H. Section 22 30 00 - Plumbing Equipment: Faucets, traps, piping.

I. Section 22 40 00 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2022.

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. BHMA A156.9 - Cabinet Hardware 2020.

F. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.

G. PS 1 - Structural Plywood; 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data:
   1. Provide instructions for attachment hardware and finish hardware.
   2. Provide data on solid surfacing materials.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
   2. Provide the information required by AWI/AWMAC/WI Architectural Woodwork Standards.

D. Submit manufacturer's samples of solid surfacing material.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

1.08 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in and orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade.

B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

C. Interior Woodwork Items:
1. High School: Solid Surfacing toilet room shelf.
2. Middle School: Solid surfacing vanities in locker rooms.
3. Middle School: Teak lumber for shower bench.
4. Floyd Elementary: Solid Surfacing countertops at cabinetry.

2.02 LUMBER MATERIALS

A. Softwood Lumber: Pine species, Plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

B. Hardwood Lumber: Birch or Maple species where noted, plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

C. Hardwood Lumber for Shower Room Benches: Southeast Asian Teak, Plain sawn, maximum moisture content of 6 percent; Grade 1, 95% heartwood with stable color, no piths or cracks. Some sound knots allowable

2.03 SHEET MATERIALS

A. Softwood Plywood Not Exposed to View: Any face species, veneer core; PS 1 Grade A-B; glue type as recommended for application.

2.04 SOLID SURFACING: SOLID SURFACING SHEET OR PLASTIC RESIN CASTING SELF-SUPPORTING OVER STRUCTURAL MEMBERS.

A. Flat Sheet Thickness:
1. Countertops: 1/2 inch, minimum; exposed edge to be built up to 1-1/2 inch thick with square edge.

B. Solid Surfacing Sheet: Complying with ISSFA-2 and NEMA LD 3; acrylic or polyester 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.
1. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E84.
2. Finish on Exposed Surfaces: Semi-gloss, gloss rating of 25 to 50.
3. Color and Pattern: To be selected from manufacturer's full line.
4. Manufacturers:
   a. Dupont: www.corian.com.
   b. Formica Corporation: www.formica.com.
   c. Wilsonart International, Inc: www.wilsonart.com.
   d. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

C. The Design Professional reserves the right to select the solid surfacing colors/patterns from any combination of the manufacturer's listed above.

D. Exposed Edge Treatment: Square edge.

2.05 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; zinc finish in concealed locations and nickel chrome finish in exposed locations.

C. Concealed Joint Fasteners: Threaded steel.

2.06 ACCESSORIES

A. Primer: Alkyd primer sealer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 HARDWARE

A. Hardware: Comply with BHMA A156.9.

B. Aluminum Countertop Supports:
   1. "Rakks EH-LV-80" ADA-Compliant Vanity Support Bracket manufactured by Rangine Corporation, www.rakks.com.
      a. Acrylic or Epoxy adhesive anchoring system, including nylon screens, to be utilized for fastening supports to brick or concrete masonry surfaces.
   2. Finish: Mill finish.
      a. See Section 09 90 00 for Painting.

2.08 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. Shop prepare and identify 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.

2.09 FABRICATION - SOLID SURFACING

A. Fabricate solid surfacing in accordance with manufacturer's fabrication instructions. Fabricate units without joints where possible.

B. Color of joint adhesive used must produce a totally invisible seamless surface.

C. Surface and edge gloss must be consistent throughout.

D. Provide cutouts for plumbing fixtures and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards 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 hardware supplied by Section 08 71 00 in accordance with manufacturer's instructions.

E. Install toilet accessories supplied by Section 10 28 100 in accordance with manufacturer's instructions.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 90 00.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.05 CLEANING

A. Clean woodwork items, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06 41 00

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Adjustable shelving.

D. Cabinet hardware.

E. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 06 20 00 - Finish Carpentry.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

C. BHMA A156.9 - Cabinet Hardware; 2020.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
   2. Provide the information required by AWI/AWMAC/WI Architectural Woodwork Standards.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit manufacturer's samples of plastic laminate.

1.05 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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards for Premium Grade.

B. Plastic Laminate Faced Cabinets: Custom grade.
   1. Adjustable Shelf Loading: 50 lbs. per sq. ft.
      a. Deflection: L/144.
   2. Cabinet Style: Flush overlay.
   3. Cabinet Doors and Drawer Fronts: Flush style.
   4. Drawer Construction Technique: Dovetail joints.

2.02 LAMINATE MATERIALS

A. Manufacturers:
   1. Arborite: www.arborite.com.
   2. Formica Corporation: www.formica.com.
   3. Wilsonart International, Inc: www.wilsonart.com.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

C. Colors will be selected from manufacturer's standard samples and may be a combination of selections from any and all manufacturers.
   1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, color as selected, finish as selected.
   2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, color as selected, finish as selected.
   3. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness, color as selected, finish as selected.
   4. Cabinet Liner: CLS, 0.020 inch nominal thickness, color as selected, finish as selected.
   5. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.03 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

2.04 ACCESSORIES

A. Adhesive: Type recommended by AWI/AWMAC to suit application.

B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; 3 mm thickness; of width to match component thickness, color as scheduled to match HPDL color.

C. Fasteners: Size and type to suit application.
   1. The following fasteners are **NOT** acceptable:
      a. "Drywall"-type screws, regardless of size, thread style or coatings.
      b. Staples.
      c. "European"-style.
      d. Mechanical, whether concealed or exposed.
      e. Nails.
      f. Plastic gussets, braces or angles.

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. Screws at removable panels to be nickel-plated, oval head type, #10 w/countersunk-style finish washers.

F. Finish Washers: Countersunk style, brass with nickel-plate finish.
   1. Product: "#10CFW" manufactured by Alma Bolt Company: www.almabolt.com.

G. Concealed Joint Fasteners: Threaded steel.

2.05 HARDWARE

A. Hardware: BHMA A156.9, types as scheduled for quality grade specified.

B. Adjustable Shelf Supports at Cabinets: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome or satin chrome finish, for nominal 1 inch spacing adjustments.
   1. Product: #346 ANO manufactured by Knape & Vogt.

C. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch spacing adjustments.
   1. Shelf Standards: 12 gauge, Anochrome finish; No. 87 ANO manufactured by Knape and Vogt.
   2. Shelf Brackets: 12 gauge, heavy-duty nylon cam lock lever, Anochrome finish; No. 187LL manufactured by Knape & Vogt.
   3. Shelf Supports: Front rest, Anochrome finish; No. 212 manufactured by Knape & Vogt.

D. Pulls: "U" shaped wire pull, 4 inch centers, "U" shaped wire pull, 4 inch centers.
   1. Product: MC402-4 manufactured by The Engineered Products Company (EPCO): www.epcohardware.com.

E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finishbronze with satin finish.
   1. Product: CLPN05 manufactured by Kenstan Lock Co.
   2. Product: Elbow catch for inactive door, strike plate has slot to provide adjustment, stamped steel; polished chrome; #1016-N manufactured by The Engineered Products Company (EPCO): www.epcohardware.com.

F. Catches: Roller-Type, steel case, zinc finish.
   1. Product: #503 manufactured by The Engineered Products Company (EPCO): www.epcohardware.com.

G. Drawer Slides:
   1. Static Load Capacity: Heavy Duty grade.
   2. Mounting: Side mounted.
   3. Stops: Positive type.
   4. Products:
      a. Knape & Vogt Manufacturing Company; Product 8405: www.knapeandvogt.com.

H. Hinges: Semiconcealed, steel five knuckle type type, finish and color as selected by Design Professional.

2.06 FABRICATION

A. Cabinet Doors: Flush style.

B. Cabinet Body Members:
   1. Acceptable Joinery Technique:
      a. Tops, Exposed Ends and Bottoms: Doweled (3 inches OC) and pressure-glued.
      b. Face Frames and Plant-On Backs: Butt joint, pressure-glued and fastened with high thread screws (NOT drywall-type screws) at eight (8) inches OC.
   2. The following styles of joinery are **NOT** acceptable:
      a. "European" assembly screws.
      b. Concealed interlocking mechanical fasteners.
      c. Spline or Biscuit.
      d. 90 degree butt joints.
      e. Mitered joints (Full faced or lock).
      f. Square shoulder.
      g. Plastic or metal brackets, braces, gussets or angles.

C. Drawer Members:
   1. Acceptable Joinery Techniques: Dovetail, Dowel, French Dovetail, Lock Shoulder.
   2. The following styles of joinery are **NOT** acceptable:
      a. "European" assembly screws.
      b. Concealed interlocking mechanical fasteners.
      c. Spline or Biscuit.
      d. 90 degree butt joints.
      e. Mitered joints (Full faced or lock).
      f. Square shoulder.
      g. Plastic or metal brackets, braces, gussets or angles.

D. Cabinets and shelves shall be constructed of the following materials:
   1. Cabinet Body: Medium Density Fiberboard (MDF), 3/4 inch thick.
      a. For cabinets that exceed 36 inches in width, the horizontal members shall be Medium Density Fiberboard (MDF), 1 inch thick.
   2. Cabinet Doors: Medium Density Fiberboard (MDF), 3/4 inch thick.
   3. Shelves: Medium Density Fiberboard (MDF), 3/4 inch thick for shelves up to 36 inches in length, 1 inch thick for shelves over 36 inches in length.
      a. Exposed shelves shall be laminated with 0.048 HPDL on all surfaces.
   4. Backs: Medium Density Fiberboard (MDF), 3/8 inch thick.
   5. Drawer Fronts: Medium Density Fiberboard (MDF), 3/4 inch thick.
   6. Drawer Sides, Backs and Subfronts:

a. Solid hardwood lumber, 1/2 inch thick.
b. Hardwood plywood, 7 ply, no voids, 1/2 inch thick, eased edges at inside faces.
c. Medium Density Fiberboard (MDF), 1/2 inch thick laminated on interior drawer surfaces with 0.048 HPDL; One (1) mm thick PVC edgebanding on top edge of box.

7. Drawer Bottoms: Tempered Hardboard, 1/4 inch thick, captured in grooves on drawer frame.
8. Cabinet Liner: "Melamine"-type panels will be acceptable for use only at cabinet interiors and adjustable shelves which are closed to view by doors. Open casework which is exposed to view, without doors or drawers, shall receive 0.048 HPDL finishes on all surfaces. All other surfaces, including tops and bottoms of wall hung cabinets shall receive 0.048 HPDL finishes regardless of the position or elevation of the member.
   a. Cabinet liner is not acceptable on exposed adjustable shelves.

E. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

F. Edging: Fit doors and exposed edges with specified edging. Do not use more than one piece for any single length.

G. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

H. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
   2. Cap exposed plastic laminate finish edges with plastic trim.

I. Provide minimum 5 mm holes, one (1) inch on center w/dual pin supports for shelving; centerline of holes shall be a minimum of one (1) inch and a maximum of three (3) inches from the front and back edge of the depth of the shelf to be supported with a spread of no less than 60% of the shelf in any case.

J. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
   1. Provide center matched panels at each elevation.
   2. Provide sequence matching across each elevation.
   3. Carry figure of cabinet fronts to toe kicks.

K. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.

L. Adhere back splash to countertop substrate and secure with wood screws at 8 inches on center.

M. Install locks on all doors and drawers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use concealed joint fasteners to align and secure adjoining cabinet units.

C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

D. Secure cabinets to floor using appropriate angles and anchorages.

3.03 ADJUSTING

A. Test installed work for rigidity and ability to support loads.

B. Adjust moving or operating parts to function smoothly and correctly.

C. Adjust all doors and drawers to provide equal margins.

3.04 CLEANING

A. Clean casework, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at cavity wall construction, perimeter foundation wall and underside of floor slabs.

B. Batt insulation for fascias, soffits and window and door shim spaces and crevices in exterior walls.

1.02 RELATED REQUIREMENTS

A. Section 07 27 00 - Air Barriers: Separate air barrier materials.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2022.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

D. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C; 2026.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide manufacturer’s data on product characteristics, performance criteria, product limitations, and accessories.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.

B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

C. Insulation In Metal Framed Walls: Extruded polystyrene (XPS) board.

D. Insulation at Fascias, Soffits & Door Jambs: Mineral wool insulation.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
   1. Location: For under concrete slabs and perimeter of foundations.
   2. Type and Compressive Resistance: Type VI, 40 psi, minimum.
   3. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   4. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   5. Type and Thermal Resistance, R-value: Type IV, 5.0, minimum, per 1 inch thickness at 75 degrees F mean temperature.
   6. Board Edges: Square.
   7. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
   8. Products:
      a. DuPont de Nemours, Inc; Styrofoam Brand Highload 40: building.dupont.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Extruded Polystyrene (XPS) Cavity Wall Insulation Board: Comply with ASTM C578 and manufactured using carbon black technology.
   1. Type and Compressive Resistance: Type IV, 25 psi, minimum.
   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. Type and Thermal Resistance, R-value: Type IV, 5.6, minimum, per 1 inch thickness at 75 degrees F mean temperature.
    a. R-value: R-15.
5. Board Size: 15-3/4 inch by 96 inch.
6. Board Thickness: 3 inch.
7. Board Edges: Square.
8. Type and Water Absorption: Type IV, 0.1 percent by volume, maximum, by total immersion.
9. Products:
    a. DuPont de Nemours, Inc; Styrofoam Brand Cavitymate Ultra: building.dupont.com.
    b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
2. Thermal Resistance: R-value of R-15.
3. Thickness: 3.5 inches.
4. Products:
    a. ROCKWOOL; COMFORTBATT: www.rockwool.com.
    a. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.04 ACCESSORIES

A. Air Barrier: Specified in Section 07 27 00.

B. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
1. Application: Sealing of interior circular penetrations, such as pipes or cables.
2. Width: Are required for application.

C. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
1. Width: 5-1/2 inches.
2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.

D. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

E. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Install boards horizontally on foundation perimeter.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT CAVITY WALLS

A. Install boards to fit snugly between wall ties.

B. Install boards horizontally on walls.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Place 6 inch wide polyethylene sheet at perimeter of wall openings, from adhered air barrier bed to window and door frames, and tape seal in place to ensure continuity of air barrier.

3.04 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.05 BATT INSTALLATION

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

B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Fasten insulation batts in place.

3.06 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

B. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 27 00

AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mechanically fastened sheet air barrier over exterior gypsum-based sheathing.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Sealant materials and installation techniques.

B. Section 09 21 16 - Gypsum Board Assemblies: Air barrier under exterior cladding.

1.03 DEFINITIONS

A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.04 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

B. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

C. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum three 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.

1.07 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

A. Air Barrier Sheet, Mechanically Fastened:
   1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4degrees F.
   3. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 90 days of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 15 or less, Class A, when tested in accordance with ASTM E84.
   5. Comply with NFPA 285 requirements for wall assembly.
   6. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2-1/2 inches wide, compatible with sheet material, unless otherwise indicated.
   7. Products:
      a. DuPont de Nemours, Inc; Tyvek CommercialWrap D with Tyvek Wrap Caps and Tyvek Tape: www.dupont.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Accessories:
   1. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

B. Where existing conditions are responsibility of another installer, notify Design Professional of unsatisfactory conditions.

C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.02 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 and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's 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 application temperature ranges. Consult manufacturer if temperature is out of this range.

D. Mechanically Fastened Sheets- On Exterior:
   1. Install sheets shingle fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
   3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
   4. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
   5. Install air barrier underneath jamb flashings.
   6. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.

E. Openings and Penetrations in Exterior Weather Barriers:
   1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
   2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
   3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
   4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather 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 weather barrier surface.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 41 13
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal roof panel system of preformed steel panels.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Roof sheathing.

B. Section 07 42 13 - Metal Wall Panels: Preformed wall panels.

C. Section 07 72 53 - Snow Guards: Fence-type snow guards to be installed on panels.

D. Section 07 90 05 - Joint Sealers: Sealing joints between metal roof panel system and adjacent

1.03 REFERENCES

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 A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025.

C. ASTD1970/D1970- Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

E. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2025.

F. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2023.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.
   3. 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.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Test Reports: Indicate compliance of metal roofing system to specified requirements.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 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 the type specified and with at least three years of documented experience.

1.06 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.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. See Construction Manager's General Requirements for additional warranty requirements.

B. Finish Warranty: Provide 20-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

2.01 MANUFACTURERS

A. Architectural Metal Roof Panel Manufacturers:
   1. Petersen Aluminum Corporation; "Tite-Loc Plus Panel": www.pac-clad.com.
   2. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 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.
   2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
   3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

2.03 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. Aluminum-zinc alloy-coated steel complying with ASTM A792/A792M; minimum AZ50 coating.
      b. Steel Thickness: Minimum 22 gauge.
   2. Profile: 2 inch high ribs; Standing seam, with separate snap-on battens of same metal as panels; concealed fastener system.
   3. Texture: Striated.
   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: Maximum panel coverage of 12 inches.

2.04 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.

2.05 FABRICATION

A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

B. Joints: Factory-install captive gaskets, sealants, or separator strips at panel joints to provide weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.06 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 metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected by Design Professional from manufacturer's standard line.

2.07 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.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
   3. Seam sealant must be factory-applied, non-skinning, non-drying type.

D. Underlayment: Self-adhering polymer modified asphalt sheet complying with ASTM D1970/D1970M, with strippable release film and top surface of woven polyolefin.
   1. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self adhesive sheet.
   2. Sheet Thickness: 40 mils, 0.040 inch, minimum.
   3. Self Sealability: Nail sealability in accordance with ASTM D1970/D1970M.
   4. Low Temperature Flexibility: Comply with ASTM D1970/D1970M.
   5. Water Vapor Permeance: 0.067 perm, maximum, when tested in accordance with ASTM E96/E96M using Desiccant Method (Method A).

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

A. Broom clean wood sheathing 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. Coordinate installation of waterproof membrane over roof sheathing with Section 061000.

D. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.

E. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.

F. 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.

3.03 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. Accessories: Install necessary components that are required for complete roofing assembly, including flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Install underlayment on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. 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. Offset seams in underlayment.

D. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
   1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
   2. Provide concealed clips at panel joints, and apply snap-on battens to provide weathertight joints.
   3. Provide sealant tape or other approved joint sealer at lapped panel joints.
   4. Install sealant or sealant tape at end laps and side joints as recommended by metal roof panel manufacturer.

3.04 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.

3.05 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.

C.

END OF SECTION

SECTION 07 42 01

ALUMINUM COMPOSITE PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Composite building panels for wall cladding.

B. Moldings, trim and accessories.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 27 02 - Air Barriers.

C. Section 07 41 13 - Metal Roof Panels.

D. Section 07 42 13 - Metal Wall Panels.

E. Section 07 62 00 - Sheet Metal Flashing and Trim.

F. Section 07 90 00 - Joint Sealants.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM) B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

B. American Society for Testing and Materials (ASTM) C481 - Laboratory Aging of Sandwich Constructions.

C. American Society for Testing and Materials (ASTM) E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

D. American Society for Testing and Materials (ASTM) E84 - Surface Burning Characteristics of Building Materials.

E. American Society for Testing and Materials (ASTM) E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.

F. American Society for Testing and Materials (ASTM) E289 - Linear Thermal Expansion of Rigid Solids with Interferometry.

G. American Society for Testing and Materials (ASTM) E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors.

H. American Society for Testing and Materials (ASTM) E331 - Water Penetration for Exterior Windows, Curtain Walls, and Doors.

I. American Society for Testing and Materials (ASTM) D1781 - Climbing Drum Peel for Adhesives.

J. American Society for Testing and Materials (ASTM) - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

K. American Architectural Manufacturers Association (AAMA) 605.2 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

L. American Architectural Manufacturers Association (AAMA) TIR-a11 - Maximum Allowable Deflection of Framing Systems for Building Cladding Components at Design Wind Loads.

1.04 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Design system to accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to temperature and humidity ranges reasonably anticipated.
   2. Design system to accommodate tolerances of structure.

B. Performance Requirements:
   1. Submit test data witnessed by an independent testing agency for the following requirements:
      a. Structural tests for wind loads by "Chamber Method" in compliance with ASTM E72.
         1) Standard test design loading: 20 psf (960 Pa) positive and negative wind load.

2) Design panel system to withstand code imposed design loads and a deflection limit of L/180 shall apply to positive load pressures only.
3) Design panel system to withstand code imposed design loads and a deflection limit of L/175 shall apply to positive load pressures only.

b. Air Infiltration: 0.06 cfm per square foot (32 lps per square meter) air leakage under a static pressure of 1.56 psf (7.65 kg/sq m) when tested in accordance with ASTM E283.

c. Water Penetration: No uncontrolled water penetration through the standard vertical panel and sealed joints at a static pressure of 6.24 psf (30.5 kg/sq m) when tested in accordance with ASTM E331.

1.05 SUBMITTALS

A. See Construction Manager's General 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. Installation methods.

C. Shop Drawings: Submit shop drawings showing layout, flashings, drainage, ventilation, vapor barriers, vapor retarders, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.

D. Samples: Submit sample panels, minimum 3 x 5 inches in size illustrating full range of colors available.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Installer Qualifications:
1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
2. Panel Installer shall assume responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store panels horizontally, off-the-ground, in manufacturer's unopened packaging until ready for installation.

B. Examine delivered materials upon receipt to ensure that no damage has occurred during shipment. Store metal-faced composite wall panels horizontally, covered with a suitable weather tight and ventilated covering. Store Metal-faced composite wall panels to ensure dryness, with a positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. DO NOT allow storage space to exceed 120 degrees F (49 degrees C).

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 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.

1.09 WARRANTY

A. Provide manufacturer's standard material warranty in accordance with Section 01 10 00 - General Requirements.

B. Finish Warranty: Commencing on Date of Substantial Completion.
1. Provide 20 year written warranty with PVDF fluoropolymer finish color coated metal finish covering color fading, chalking, and film integrity.
2. Finish coating shall not peel, blister, chip, crack or check.
3. Chalking, fading or erosion of finish measured by the following tests:

a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D659.
b. Finish coating shall not change color or fade in excess of 8 NBS units as determined by ASTM D2244.

C. Material and Installation Warranty: Commencing on Date of Substantial Completion.
1. When installed as directed by Laminators, panels covered by this warranty are warranted not to delaminate (separate) at any Laminators produced glue line for a period of five years.

PART 2 PRODUCTS

2.01 COMPOSITE PANELS

A. Acceptable Manufacturers:
1. Laminators Inc; "OMEGA-LITE": www.laminatorsinc.com.
2. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Composite Panel: Aluminum skin panel bonded to corrugated polyallomer core; Class A flame spread rating; minimum 48 inch wide sheets; constructed as follows:
1. Face Skin: 0.032 inch thick.
2. Corrugated Polyallomer Backer: 5 mm thick.
3. Mill finish aluminum backer: .013 inch thick
4. Overall panel thickness: 6 mm.

C. Moldings and Trims: Extruded aluminum; as supplied by panel manufacturer or custom fabricated to comply with manufacturer's recommendations and warranty.

D. Use at Pine River Elementary smooth accent metal fascia and soffit.

2.02 ACCESSORIES

A. Gaskets: Type recommended by panel manufacturer.

B. Sealant and Backing Materials: Type and grade recommended by panel manufacturer; coordinate with Joint Sealants, Section 07 90 05.

C. Adhesives: Type tested and approved by manufacturer:

D. Panels and Corner Moldings: One piece Tight-Fit moldings
1. As required for a complete installation.
2. High performance fluoropolymer "KYNAR 500" two coat system.
a. Colors of panel and corner moldings shall be selected from manufacturer's standards.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine substrates, areas, and conditions, with substrate installer present, for compliance with requirements for structural soundness, installation tolerances, metal panel supports, and other conditions affecting performance of work.
1. Examine primary and secondary wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances listed below.
a. 1/4 inch (6 mm) in any 20 feet (6 m) length vertically or horizontally.
b. 1/2 inch (12 mm) in any building elevation.
2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required.
3. For the record, prepare written report, endorsed by panel installer and substrate installer, listing remedy for conditions detrimental to performance of work.

C. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.

D. Proceed with installation only after all unsatisfactory conditions have been corrected.

E. If substrate preparation is the responsibility of another installer, notify General Contractor of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's installation instructions.

B. Install starter strips, corner strips, and moldings level and plumb.

C. Install with concealed fasteners at moldings, adhesives and caulk joints as per manufacturer's instructions.

D. Secure components to furring, maintaining required expansion clearances. Provide backing at all panel edges, including edges adjacent to the continuous soffit vent.

E. Remove site cuttings from finish surfaces.

F. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

G. Seal to prevent weather penetration. Maintain neat appearance.

3.03 CLEANING AND PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.

B. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 42 13

METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for walls, related flashings, and accessory components.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wall panel substrate.

B. Section 07 21 00 - Thermal Insulation.

C. Section 07 27 02 - Air Barriers: Air barrier under wall panels.

D. Section 07 41 13 - Metal Roof Panels.

E. Section 07 42 01 - Aluminum Composite Panels.

F. Section 07 62 00 - Sheet Metal Flashing and Trim.

G. Section 07 90 05 - Joint Sealers.

1.03 REFERENCES

A. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.

C. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

D. Samples: Submit two samples of wall panel and soffit panel, 6 inch by 6 inch in size illustrating finish color, sheen, and texture.

1.05 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 installing the products specified in this section with minimum three years of documented experience.

1. Panel Installer shall assume responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. Correct defective work within a 20 year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

B. Correct defective Work within a 20 year period after Substantial Completion, including defects in water tightness and integrity of seals.

C. Finish Warranty: Standard form in which manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish, including flaking or peeling from approved primed metal substrate, chalk in excess of 8 when tested in accordance with ASTM D4214, Method A, and /or color fading in excess of 5 ΔE Hunter units on panels when tested in accordance with ASTM D2244.

1. Warranty Period: Twenty (20) years from date Substantial Completion, or 20 years and 3 months from the date of shipment from manufacturer’s plant, whichever occurs first.

PART 2 PRODUCTS

2.01 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
   1. Provide exterior panels and subgirt framing assembly.
   2. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall.
   3. Design Pressure: In accordance with applicable codes.
   4. Maximum Allowable Deflection of Panel: 1/90 of span.
   5. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
   6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
   7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
   8. Corners: Factory-fabricated in one continuous piece with minimum 18 inch returns.
   9. Provide continuity of air barrier and vapor retarder seal at building enclosure elements in conjunction with materials specified in Section 07 27 02.
   10. Exterior Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating.
   11. Exterior Panel Back Coating: Panel manufacturer's standard polyester wash coat.

B. Exterior Wall Ribbed Panels:
   1. Profile: Vertical.
   2. Style: Basis of Design is “HIGHLINE M1” concealed fastener as manufactured by Petersen Aluminum Corporation.
   3. Panel Depth: 1-3/8 inches.
   4. Material: Pre-coated aluminum sheet, minimum 0.050 inch thick.
   5. Panel Width: 12 inches.
   6. Panel joint: Tongue and groove interlock joint.
   7. Color: As selected by Design Professional from manufacturer's signature series.

C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles. Mitered internal corners to be back braced.

D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

E. Anchors: Galvanized steel.

2.02 ACCESSORIES

A. Gaskets: Type recommended by panel manufacturer.

B. Sealant and Backing Materials: Type and grade recommended by panel manufacturer; coordinate with Joint Sealants, Section 07 90 05.

C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.
   1. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws.

D. Field Touch-up Paint: As recommended by panel manufacturer.

E. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

B. Verify that weather barrier has been installed over substrate completely and correctly.

3.02 INSTALLATION

A. Install panels on walls and soffits in accordance with manufacturer's instructions.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

C. Fasten panels to structural supports; aligned, level, and plumb.

D. Locate joints over supports. Lap panel ends minimum 2 inches.

E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 TOLERANCES

A. Maximum Offset from True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.04 3.05 CLEANING

A. Remove site cuttings from finish surfaces.

B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 54 00

THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mechanically attached system with thermoplastic roofing membrane.

B. Insulation, flat and tapered.

C. Flashings, stack boots, and related details.

D. Fasteners, adhesives, and accessories.

E. Traffic protection.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers.

B. Section 07 62 00 - Sheet Metal Flashing and Trim.

C. Section 20 00 00 - Basic Mechanical Requirements: Temporary removal and reinstallation of rooftop equipment.

D. Division 26 - Electrical: Temporary removal and reinstallation of rooftop equipment.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2022a.

C. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.

D. ASTM D4434/D4434M - Standard Specification for Poly (Vinyl Chloride) Sheet Roofing; 2022.

E. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2021.

F. ASTM E108 - Standard Test Method for Fire Tests of Roof Coverings; 2020a.

G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2024.

H. NRCA (RM) - The NRCA Roofing Manual; 2025.

I. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

J. UL - Roofing Materials and Systems Directory, Roofing Systems (TGFU.R10128).

1.04 SUBMITTALS

A. See Construction Manager's General Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, fasteners, and adhesives.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

1. Samples: Provide Two (2) 4 inch x 6 inch samples of roofing membrane from manufacturer’s full range of colors.
2. Installer’s Certification: Certification from the roofing system manufacturer that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

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

1.05 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual.

B. Perform work in accordance with manufacturer’s installation instructions.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

D. Installer Qualifications: Company specializing in performing the work of this section:
   1. With minimum five years documented experience.
   2. Approved by membrane manufacturer.

E. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for roof assembly wind uplift and fire hazard requirements.

B. Fire Exposure: Provide membrane roofing materials with the following fire-test-response characteristics. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
   1. Exterior Fire-Test Exposure:
      a. Class A; ASTM E108, for application and roof slopes indicated.
   2. Fire-Resistance Ratings: Comply with ASTM E119 for fire-resistance-rated roof assemblies of which roofing system is a part.
   3. Conform to applicable code for roof assembly fire hazard requirements.

C. Wind Uplift:
   1. Roofing System Design: Provide a roofing system designed to resist uplift pressures calculated according to the current edition of the ASCE-7 Specification.

1.07 PRE-INSTALLATION MEETING

A. Convene meeting not less than one week before starting work of this section.

B. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following.
   1. Meet with Owner, Design Professional, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
   2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   4. Review structural loading limitations of roof deck during and after roofing.
   5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   6. Review governing regulations and requirements for insurance and certificates if applicable.
   7. Review temporary protection requirements for roofing system during and after installation.
   8. Review roof observation and repair procedures after roofing installation.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.09 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.10 WARRANTY

A. Contractor's Warranty: The contractor shall warrant the roof application with respect to workmanship and proper application for two (2) years from the effective date of the warranty issued by the manufacturer.

B. Manufacturer's Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.
   3. Exceptions **NOT** Permitted:
      a. Damage due to roof traffic.

1.11 MANUFACTURERS

A. PVC Membrane Materials:
   1. Basis-Of-Design: Duro-Last 50-mil (DL50) membrane: www.duro-last.com
   2. Substitutions: Not permitted.

B. Insulation:
   1. Atlas Roofing Corporation: www.atlasroofing.com.
   2. Carlisle SynTec: www.carlisle-syntec.com.
   3. Duro-Last: www.duro-last.com.
   4. GAF: www.gaf.com.
   5. Owens Corning Corp: www.owenscorning.com.
   6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

1.12 ROOFING

A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, over insulation.

B. Acceptable Insulation Types - Any type that meets requirements and is approved by membrane manufacturer for application.
   1. Minimum 1 layer of 1-1/2 inch thick polyisocyanurate board insulation; unless otherwise noted on Drawings.

1.13 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Material: Polyvinyl chloride copolymer alloy complying with ASTM D4434.
   2. Reinforcing: Internal fabric.
   3. Thickness: 0.050 mil, minimum.
   4. Color: Verify and match existing color at each building.
      a. Bullock Creek High School: Tan.
      b. Bullock Creek Middle School, Floyd Elementary and Pine River Elementary: White.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer for metal and wood roof deck.
   1. Membrane-surfaced washers and screws.

D. Flexible Flashing Material: Same material as membrane.

1.14 INSULATION

A. General:
   1. Provide preformed roof insulation boards that comply with requirements and referenced standards, as selected from manufacturer's standard sizes.
   2. Provide preformed saddles, crickets, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1 and with the following characteristics:
   1. Compressive Strength: 16 psi
   2. Board Size: 48 x 96 inch.
   3. Board Thickness: As noted otherwise on Drawings.
   4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
   5. Board Edges: Square.

1.15 ACCESSORIES

A. General: Provide roof insulation accessories approved by the roof membrane manufacturer and as recommended by insulation manufacturer for the intended use.

B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

C. Pre-Cut Tapered Insulation:
   1. Manufacturers:
      a. Atlas Roofing Corporation; Gemini Pre-Cut Crickets, Gemini One-Piece Drain Set, Gemini One-Piece Miter, and Gemini Tapered Edge Strip: www.atlasroofing.com.

D. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

E. Insulation Fasteners for Mechanically Fastened Roof Areas: Appropriate for purpose intended and approved by roofing manufacturer.
   1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

G. Roofing Nails: Galvanized, hot dipped type, size and configuration as required to suit application.

H. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.

I. Sealants: As recommended by membrane manufacturer.

J. Two-Way Roof Vents: Install a minimum of 1 vent for each 1,000 ft² of roof area.

K. Traffic Protection: Provide non-skid, maintenance-free walkway pads below each pipe support and each mechanical rail support.
   1. Basis-of-Design:
      a. Duro-Last Roof Trak® III Walkway Pad as manufactured be Duro-Last, Inc.: www.duro-last.com.
      b. Surface Color: White.

PART 2 EXECUTION

2.01 INSTALLATION - GENERAL

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Coordinate the work with installation of associated counter flashings installed by other sections as the work of this section proceeds.

G. Coordinate temporary disconnection of natural gas piping and electrical wiring to existing rooftop equipment if lifting of equipment is required to achieve acceptable flashing requirements.

2.02 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify roof surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and reglets are in place.

2.03 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.

C. Surfaces shall be clean, smooth, free of fins, sharp edges, loose and foreign material, oil, grease, and bitumen.

2.04 INSTALLATION

A. Insulation:
   1. Install insulation in accordance with the roof manufacturer's requirements.
   2. Attachment of Insulation:
      a. Mechanically fasten first layer of insulation, over existing insulation, to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
   3. Insulation shall be adequately supported to sustain normal foot traffic without damage.
   4. Where field trimmed, insulation shall be fitted tightly around roof protrusions with no gaps greater than 1/4 inch.
   5. No more insulation shall be applied than can be covered with the roof membrane by the end of the day or the onset of inclement weather.
   6. If more than one layer of insulation is used, all joints between subsequent layers shall be offset by at least 6 inches.
   7. Loosely lay insulation boards in parallel courses with end joints staggered 50% and adjacent boards butted together with no gaps greater than 1/4 inch.
   8. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
   9. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.

B. Roof Membrane: 50 mil, thermoplastic membrane.
   1. Use only fasteners, stress plates and fastening patterns accepted for use by the roof manufacturer. Fastening patterns must meet the applicable design requirements.
   2. Install fasteners in accordance with the roof manufacturer’s requirements. Fasteners that are improperly installed shall be replaced or corrected.
   3. Mechanical Attachment: Apply membrane and mechanical attachment devices fastened to the structural deck utilizing fasteners and fastening patterns that in accordance with the roof manufacturer’s requirements.
   4. Cut membrane to fit neatly around all penetrations and roof projections.
   5. Unroll roofing membrane and positioned with a minimum 6 inch overlap. Wrinkles in membrane are **NOT** acceptable.

C. Seaming:
   1. Weld overlapping sheets together using hot air. Minimum weld width is 1-1/2 inches.
   2. Check field welded seams for continuity and integrity and repair all imperfections by the end of each workday.

D. Membrane Termination/Securement: All membrane terminations shall be completed in accordance with the membrane manufacturer’s requirements.
   1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, expansion joint, interior wall, penthouse, and other similar condition.
   2. Provide securement at any angle change where the slope or combined slopes exceeds two inches in one horizontal foot.

E. Flashings: Complete all flashings and terminations as indicated on the drawings and in accordance with the membrane manufacturer’s requirements.
   1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, expansion joint, interior wall, penthouse, and other similar condition.
   2. Do not apply flashing over existing thru-wall flashings or weep holes.
   3. Secure flashing on a vertical surface before the seam between the flashing and the main roof sheet is completed.

4. Extend flashing membrane a minimum of 6 inches onto the main roof sheet beyond the mechanical securement.
5. Use care to ensure that the flashing does not bridge locations where there is a change in direction (e.g. where the parapet meets the roof deck).

F. Penetrations:
1. Flash all pipes, supports, soil stacks, cold vents, and other penetrations passing through the roofing membrane as indicated on the Drawings and in accordance with the membrane manufacturer's requirements.
2. Utilize custom prefabricated flashings supplied by the membrane manufacturer.

G. Pipe Clusters and Unusual Shapes:
1. Clusters of pipes or other penetrations which cannot be sealed with prefabricated membrane flashings shall be sealed by surrounding them with a prefabricated vinyl-coated metal pitch pan and sealant supplied by the membrane manufacturer.
2. Vinyl-coated metal pitch pans shall be installed, flashed and filled with sealant in accordance with the membrane manufacturer's requirements.
3. Pitch pans shall not be used where prefabricated or field fabricated flashings are possible.

H. Roof Drains:
1. Provide a smooth clean surface on the mating surface between the clamping ring and the drain base.

I. Edge Details:
1. Provide edge details as indicated on the Drawings. Install in accordance with the membrane manufacturer's requirements.
2. Join individual sections in accordance with the membrane manufacturer's requirements.
3. Coordinate installation of metal flashing and counter flashing specified in Section 07 62 00.

J. Traffic Protection:
1. Install walkway pads in accordance with the membrane manufacturer's requirements.
2. Provide walkways pads where indicated on the Drawings.
3. Install walkway pads at roof hatches, access doors, rooftop ladders and all other traffic concentration points regardless of traffic frequency. Provided in areas receiving regular traffic to service rooftop units or where a passageway over the surface is required.
4. Do not install walkways over flashings or field seams until manufacturer's warranty inspection has been completed.

K. Water cut-offs:
1. Provide water cut-offs on a daily basis at the completion of work and at the onset of inclement weather.
2. Provide water cut-offs to ensure that water does not flow beneath the completed sections of the new roofing system.
3. Remove water cut-offs prior to the resumption of work.
4. The integrity of the water cut-off is the sole responsibility of the roofing contractor.
5. Any membrane contaminated by the cut-off material shall be cleaned or removed.

L. Piping and Conduit Supports:
1. Remove existing wooden piping and conduit supports. Install at previous locations a new support with walkway pad underneath.
   a. Pipe and Conduit Supports for Up To 2 Inch Diameter: "CADDY PYRAMID EZ SERIES" manufactured by ERICO International Corporation: www.erico.com.
   b. Pipe, Conduit and Equipment Supports with strut channel: "CADDY PYRAMID ST SERIES" manufactured by ERICO International Corporation: www.erico.com.

2.05 FIELD QUALITY CONTROL

A. The membrane manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors shall be addressed, and final punch list completed.

2.06 CLEANING

A. Remove all extra sealant from finished surfaces. Installed sealant is to neat and smooth.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

2.07 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic is anticipated over completed roofing membrane, protect from damage using durable materials that are compatible with membrane.

C. Repair or replace damaged products after work is completed.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, fascias, gutters and downspouts.

B. Soffit vents.

C. Sealants for joints within sheet metal fabrications.

D. Concrete splash pans.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers.

B. Section 07 41 13 - Metal Roof Panels.

C. Section 07 42 01 - Aluminum Composite Panels.

D. Section 07 42 13 - Metal Wall Panels.

E. Section 07 54 00 - Thermoplastic Membrane Roofing: Roofing system.

F. Section 07 90 05 - Joint Sealers.

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

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. CDA A4050 - Copper in Architecture – Handbook; Current Edition.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures,

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Include manufacturer's data related to galvanized coatings for all typical fasteners intended for use on this Project, galvanized coatings for all sheet steel fabrications and certification that all galvanized metals comply with the references listed in the Documents.

D. Samples: Submit two samples 6 x 6 inch in size illustrating metal finish color.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Stack material to prevent twisting, bending and abrasion and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal, shop pre-coated with PVDF coating.

1. Galvanized Steel Sheet Thicknesses: Shop finished after forming; of the following minimum gauges:

a. Up to 6 inch face: 25 gauge.
b. Up to 8 inch face: 24 gauge.
c. Up to 10 inch face: 22 gauge

2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
3. Color: As selected by Design Professional from manufacturer's custom colors.

B. Pre-Finished Aluminum: ASTM B209/B209M, 3005 alloy, H14 temper; plain finish shop pre-coated with fluoropolymer coating.
1. Aluminum Sheet Thicknesses: shop finished after forming; of the following minimum thickness:
a. Up to 6 inch face: 0.040 inch thick.
b. 6 to 8 inch face: 0.050 inch thick.
c. 8 to 10 inch face: 0.064 inch thick.
2. Fluoropolymer Coating: High performance organic powder coating, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
3. Color: As selected by Design Professional from manufacturer's standard colors to match existing.

2.02 ACCESSORIES

A. Soffit Vents: Perforated, aluminum soffit vent “XSV Vent as manufactured by Tamlyn Industries; 6063 T-5 .050 extruded aluminum, 6 inches by 24 inches, color finish to be selected from manufacturer’s standards by Design Professional.

B. Fasteners: Galvanized steel.
1. Fasteners for pressure preservative and fire-retardant-treated wood shall be hot-dipped galvanized in accordance with ASTM A153, Class D.

C. Sealant: Type B specified in Section 07 90 05.

D. Plastic Cement: ASTM D4586, Type I.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum three inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with butt-type seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18 inch long legs; solder for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

H. Form fascia with ¼ inch expansion space at all joints. Provide back up plate behind joints, minimum 6 inches wide, of same material, profile and finish to match fascia.

2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: SMACNA Architectural Sheet Metal Manual, Rectangular profile.
1. SMACNA Style: A
2. Material: Minimum 0.040 aluminum and as per SMACNA Architectural Sheet Metal Manual standards.

B. Downspouts: Rectangular profile.

C. Gutters and Downspouts: Sizes indicated.
1. Minimum Sizes:
a. Gutters: 6 x 6 inches.
b. Downspouts: 6 x 6 inches.

D. Accessories: Profiled to suit gutters and downspouts.
1. Anchorage Devices: In accordance with SMACNA requirements.
2. Gutter Supports: Brackets.
a. Material: Aluminum; 3/16 inch thick x 1 inch wide; formed to match gutter shape.

3. Downspout Supports: Brackets.
    a. Material: Aluminum; 1/16 inch thick x 1 inch wide with flanges for fastening to wall.

E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

EXECUTION

2.05 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. Verify that barrier membrane or single-ply roofing membrane is in place over preservative or fire-retardant-treated nailers, blocking or backing.
    1. Membrane must cover the treated wood completely, preventing the sheet metal from contacting all wood surfaces.

2.06 3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

2.07 INSTALLATION

A. Comply with drawing details.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Secure gutters and downspouts in place using concealed fasteners.

G. Slope gutters 1/4 inch per 10 feet, minimum.

H. Set splash pans under downspouts.

2.08 FIELD QUALITY CONTROL

A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 72 53

SNOW GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Snow guards.

1.02 RELATED SECTIONS

A. Section 07 41 13 - Metal Roof Panels.

1.03 REFERENCES

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 SNOW GUARDS

A. Fence Type Snow Guard: Continuous snow guard; manufacturer's standard pipe, bar, channel, or solid rod, set in brackets or posts, with optional plates and metal trim to match roof.
   1. Brackets: Zinc plated steel.
   2. Pipe or Square Tube: Powder coating with color to match roof.
   3. Products:
      a. Metal Roof Innovations Ltd. S-5! Attachment Solutions; ColorGard: www.s5.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 04 20 00 - Unit Masonry.

B. Section 06 10 00 - Rough Carpentry.

C. Section 07 95 00 - Joint Sealers.

D. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

E. Section 20 00 00 - Basic Mechanical Requirements.

F. Division 26 - Electrical.

1.03 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

B. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).

C. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems; 2020a.

D. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2020a.

E. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2023b.

F. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a.

G. FM (AG) - FM Approval Guide; Current Edition.

H. ITS (DIR) - Directory of Listed Products; Current Edition.

I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

K. UL (DIR) - Online Certifications Directory; Current Edition.

L. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:

1. With minimum 3 years documented experience installing work of this type.

1.06 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

A. Manufacturers:
1. A/D Fire Protection Systems Inc: www.adfire.com.
2. 3M Fire Protection Products: www.3m.com/firestop.
3. Hilti, Inc: www.us.hilti.com.
4. Nelson FireStop Products: www.nelsonfirestop.com.
5. Specified Technologies, Inc: www.stifirestop.com.
6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 MATERIALS

A. Firestopping: Any material meeting requirements.

B. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

D. Fire Ratings: See Drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
2. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
3. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.

B. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

D. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.

4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

2.04 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

C. Install labeling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 05

JOINT SEALERS

1.01 GENERAL SECTION INCLUDES

A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-In-Place Concrete.

B. Section 04 20 00 - Unit Masonry.

C. Section 06 20 00 - Finish Carpentry.

D. Section 07 27 00 - Air Barriers.

E. Section 07 41 13 - Metal Roof Panels.

F. Section 07 42 01 - Aluminum Composite Panels.

G. Section 07 42 13 - Metal Wall Panels.

H. Section 07 54 00 - Thermoplastic Membrane Roofing.

I. Section 07 62 00 - Sheet Metal Flashing and Trim.

J. Section 07 84 00 - Firestopping.

K. Section 08 12 13 - Hollow Metal Frames.

L. Section 08 16 01 - Insulated Composite Doors.

M. Section 08 43 13 - Aluminum-Framed Storefronts.

N. Section 08 80 00 - Glazing.

O. Section 09 90 00 - Painting and Coating.

P. Section 22 40 00 - Plumbing Fixtures.

Q. Section 32 13 13 - Concrete Paving.

1.03 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 C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.

E. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.

F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

G. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

I. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

J. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

K. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

L. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).

M. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension; 2016 (Reapproved 2021).

N. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.

O. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015 (Reapproved 2021).

P. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.

Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

R. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

S. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022)

T. SWRI (VAL) - SWR Institute Validated Products Directory Current Edition.

U. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Samples: Submit manufacturer's physical samples (beads), 4 inches in size illustrating sealant colors for selection.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.07 MOCK-UP

A. Construct mock-up with specified sealant types and with other components noted.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 WARRANTY

A. See Construction Manager's General Requirements 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 Dateof Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gunnable and Pourable Sealants:
   1. Adfast USA Inc: www.adfastcorp.com.
   2. Bostik Inc: www.bostik-us.com.
   3. Dow: www.dow.com.
   4. Hilti, Inc: www.hilti.com.
   5. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
   6. Pecora Corporation: www.pecora.com.

7. Sherwin-Williams Company: www.sherwin-williams.com.
8. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com.
9. W.R. Meadows, Inc: www.wrmeadows.com.
10. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
   1. Color: To be selected by Design Professional from manufacturer's full range.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

C. Type B - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Concealed sealant bead in siding overlaps.

D. Type C - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: To be selected by Design Professional from manufacturer's full range.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

E. Type D - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.

F. Type E - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
   1. Color: To be selected by Design Professional from manufacturer's standard range.
   2. Applications: Use for:
      a. Expansion joints in floors.

G. Type F - Silicone Sealant: ASTM C920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding.
   1. Color: To be selected by Design Professional from manufacturer's standard range.
   2. Movement Capability: Plus and minus 25 percent.
   3. Service Temperature Range: -65 to 180 degrees F.
   4. Shore A Hardness Range: 15 to 35.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

3.06 SCHEDULE

A. Exterior Joints for Which No Other Sealant Type is Indicated: Type A.

B. Control and Expansion Joints in Paving: Type A.

C. Exterior Wall Expansion Joints: Type A.

D. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Type A.

E. Lap Joints in Exterior Sheet Metal Work: Type B.

F. Butt Joints in Exterior Metal Work and Siding: Type B.

G. Joints Between Exterior Metal Frames and Adjacent Work (except masonry): Type A.

H. Under Exterior Door Thresholds: Type E.

I. Interior Joints for Which No Other Sealant is Indicated: Type C.

J. Control and Expansion Joints in Interior Concrete Slabs and Floors: Type E.

K. Joints Between Plumbing Fixtures and Walls and Floors, and Between Countertops and Walls: Type D.

END OF SECTION

SECTION 08 12 13
HOLLOW METAL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal frames for non-hollow metal doors.

B. Fire-rated hollow metal frames for non-hollow metal doors.

C. Accessories, including wall anchors.

1.02 RELATED REQUIREMENTS

A. Section 08 14 16 - Flush Wood Doors.

B. Section 08 71 00 - Door Hardware.

C. Section 09 90 00 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.

C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.

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

E. 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 2024.

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 2018a.

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

H. ASTM C476 - Standard Specification for Grout for Masonry 2023.

I. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames 2016.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.

L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.

M. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames 2017.

N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.

O. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2019.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submtital 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 grade standards.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Frames:
   1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
   2. Republic Doors, an Allegion brand: www.republicdoor.com.
   3. Steelcraft, an Allegion brand: www.allegion.com.

2.02 PERFORMANCE REQUIREMENTS

A. Hollow Metal Frames: Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of side hinged doors.

B. Refer to Door and Frame Schedule on drawings for frame sizes, finishing, door hardware to be installed, and other variations, if any.

C. Door Frame Type: Provide hollow metal door frames with integral casings.
   1. Interior Doors: Use frames with integral casings.

D. Steel Sheet: Comply with one or more of the following requirements; galvannealed 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.

E. Accessibility: Comply with ICC A117.1 and ADA Standards.

F. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.

G. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

A. Frame Finish: Factory primed and field finished.

B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
   2. Frame Finish: Factory primed and field finished.

2.04 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.05 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. 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.

D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using pumped methods; bore hole in frame head for grouting; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 08 71 00.

F. Touch up damaged factory finishes.

3.03 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 in measured with straight edge, corner to corner.

3.04 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated.

1.02 RELATED REQUIREMENTS

A. Section 06 20 00 - Finish Carpentry.

B. Section 08 12 13 - Hollow Metal Frames.

C. Section 08 71 00 - Door Hardware.

D. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.

C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.

D. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. 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.

D. Samples: Submit two samples of door veneer, 4 inch by 4 inch in size illustrating wood grain, stain color, and sheen.

E. Warranty executed in Owner's name.

1.05 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.

1.06 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. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Construction Manager's General Requirements for additional warranty procedures.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.

1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:

1. Graham Wood Doors: www.grahamdoors.com.
2. Eggers Industries: www.eggersindustries.com.

3. Marshfield Door Systems, Inc: www.marshfielddoors.com.
4. Mohawk Flush Doors, Inc.: www.mohawkdoors.com.
5. VT Industries: www.vtindustries.com.
6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish:
   1. Bullock Creek Middle School, Bullock Creek Elementary School, Floyd Elementary School, and Pine River Elementary School:
      a. Wood Veneer Facing for Transparent Finish: Birch, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
   2. Bullock Creek High School:
      a. Wood Veneer Facing for Transparent Finish: Red Oak, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.

B. Vertical Edges: Any option allowed by quality standard for grade.

C. “Running Match" each pair of doors and doors in close proximity to each other.

D. “Pair Match” each pair of doors; “Set Match” pairs within 10 feet of each other when doors are closed.

E. Facing Adhesive: Type I - waterproof.

2.05 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 for hardware reinforcement.
   2. Provide solid blocking for other through-bolted hardware.

C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.

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.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
   1. Transparent:

a. System - 11, Polyurethane, Catalyzed.
b. Stain: As selected by Design Professional.
c. Sheen: Satin.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 12 13.

B. Glazing: See Section 08 80 00.

C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

D. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 16 01

INSULATED COMPOSITE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced polyester faced flush doors and transom panels.

B. Aluminum framing.

C. Manufacturer provided hardware and weatherstripping.

D. Coordination with other Sections for installation of hardware.

1.02 RELATED SECTIONS

A. Section 07 90 05 - Joint Sealers.

B. Section 08 71 00 - Door Hardware.

1.03 REFERENCES

A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2023, with Editorial Revisions.

C. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

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

E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.

F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

I. ASTM E283/E283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

J. 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).

K. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2023.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.

C. Shop Drawings: Indicate layout and profiles; include assembly methods.
   1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
   2. Indicate wall conditions, door and frame elevations, sections, materials, gauges, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.

D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

1.05 COORDINATION

A. Arrange meeting with door hardware vendors/suppliers to ensure that templates for all hardware are submitted to door manufacturer for factory preparation related to drilling, boring, cutting and tapping.
   1. If door manufacturer offers factory installation of hardware, coordinate this function with door hardware vendors/suppliers.

1.06 WARRANTY

A. See Construction Manager's General Requirements for additional warranty requirements.

A. Provide ten (10) year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fiberglas Insulated Composite Door Assemblies:
   1. Special-Lite, Inc; www.special-lite.com.
   2. Vale Door Solutions; www.valedoors.com.

2.02 DOOR AND FRAME ASSEMBLIES

A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
   1. Screw-Holding Capacity: Tested to 890 pounds, minimum.
   2. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
   3. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
   4. Clearance Between Door and Frame: 1/8 inch, maximum.
   5. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.

2.03 COMPONENTS

A. FRP Flush Doors: Fiberglass reinforced polyester face sheets interlocked to aluminum tubular stiles and rails of minimum 0.125 inch wall thickness
   1. Type: As indicated on drawings, including swinging doors.
   2. Thickness: 1-3/4 inch, nominal.
   3. Core Material: Solid foam core construction.
   4. Face Sheet Texture: Pebble grain.
   5. Door Panel Configuration: As indicated on drawings.
   6. Subframe and Reinforcements: Manufacturer's standard materials.
   7. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
   8. Color: To be selected by Design Professional, from manufacturer’s standards.

B. Door Frames: Extruded aluminum, internally reinforced at joints and hardware attachment points.
   1. Profile: 2 x 6 inch.
   2. Interior; non fire-rated:
      a. Aluminum, 0.125 inch minimum wall thickness; anodized finish.
   3. Hardware Cut-outs: Provide continuous backing or mortar guards of same material as frame, with watertight seal.
   4. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
   5. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.
   1. Color: Anodized, Architectural Class I; Clear anodized.

C. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.

2.04 PERFORMANCE REQUIREMENTS

A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.

B. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf.

C. Air Leakage: Maximum of 0.1 cfm per square foot at 6.27 psf differential pressure, when tested in accordance with ASTM E283.

D. Acoustical Performance: Sound Transmission Class (STC) of 25, minimum, when tested in accordance with ASTM E90.

E. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
   1. Izod Impact Resistance: ASTM D256, 15 foot-pounds per inch of width, minimum, with notched izod.
   2. Tensile Strength at Break: ASTM D638, 14,000 psi, minimum.
   3. Water Absorption: ASTM D570, 0.20 percent, maximum, after 24 hours at 74 degrees F.
   4. Flexural Strength: ASTM D790, 21,000 psi, minimum.

2.05 HARDWARE BY DOOR MANUFACTURER

A. Verify all hardware required with Section 08 71 00.

B. Pull: SL82, aluminum, recessed; as furnished by door manufacturer.

C. Weatherstrip: Wool pile, integral with door frame and insert frame.

2.06 HARDWARE BY CONTRACTOR

A. Provide and install door hardware as specified in Section 08 71 00.

B. Furnish templates for all hardware to door manufacturer for preparation at factory.

2.07 FABRICATION

A. Fabricate doors and frames allowing for minimum clearance and shim spacing around perimeter of assembly.

B. Accurately and rigidly fit and secure joints and corners, flush, hairline, and weatherproof.

C. Fabricate frames with door jambs extended full height of opening.

D. Internally reinforce all frame joints with full width joint anchors.

E. Fabricate door joinery with steel tie rods, top and bottom, bolted through continuous extruded splines and reinforcing angles or high modulus pultruded fiberglass tubes.

F. Prepare components with internal reinforcement for door hardware.

2.08 FINISHES

A. Aluminum Surfaces: Anodized, Architectural Class I.
   1. Pine River Elementary: Clear.

B. FRP Surfaces: Color to be selected by Design Professional.

C. Concealed Steel Items: Galvanized to 2.0 ounces per square foot.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that wall openings are ready to receive work of this section.

B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's installation instructions.

B. If the Contractor opts to field-install the door hardware, the following items apply:
   1. The door and frame manufacturer must agree, in writing, that warranties will remain valid if the door and frame is drilled, bored, threaded or cut in the field.

2. Hardware templates shall be used to locate and identify all holes.
3. All holes shall be drilled properly and accurately threaded with appropriate tapping tools.
4. The use of self-drilling or self-tapping screws is not acceptable and shall be cause for rejection of the door and frame.
5. Replacement of the door and frame shall be the Contractor's responsibility and no costs will be assessed to the Owner.

C. Use anchorage devices to securely attach frame assembly to structure.

D. Align assembly plumb and square, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Install thresholds, surface applied door closers and holders in accordance with manufacturer's installation instructions using templates provided.
1. Utilize masonry grout or leveling compounds to provide a level threshold installation where floors are not level or flat.

F. Install surface applied door closers and holders in accordance with manufacturer's installation instructions using templates provided.

G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

H. Install perimeter exterior type sealant and backing materials in accordance with Joint Sealants, Section 07 90 05.

I. Adjust hardware for smooth and balanced door operation.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Infill insulated panels and glass.

C. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

B. Section 08 16 01 - Insulated Composite Doors: Doors installed in storefront assembly.

C. Section 08 51 13 - Aluminum Windows: Aluminum windows installed in storefront framing.

D. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

E. 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.

F. 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).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Construction Manager’s General 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. Samples: Submit two samples illustrating finish aluminum surface.

E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.

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.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State of Michigan.

B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.07 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.

1.08 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.

1.09 WARRANTY

A. See Construction Manager's General Requirements for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-Of-Design: "SERIES T24650" 6" x 2 inches manufactured by Tubelite, Inc: www.tubeliteinc.com.

B. Aluminum-Framed Storefront:
   1. EFCO Corporation: www.efcocorp.com.
   2. Kawneer North America: www.kawneer.com.
   3. Oldcastle Building Envelope: www.oldcastlebe.com.
   4. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
   5. United States Aluminum Corp: www.usalum.com.
   6. YKK AP America Inc: www.ykkap.com.
   7. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with related flashings, anchorage and attachment devices.
   1. Glazing Position: Centered (front to back).
   2. Frame Head Size: Typical is 2 inches.
   3. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   4. 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.
   5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   6. 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.
   7. 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.
   8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements:

1. Wind Loads: 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.
    a. Design Wind Loads: Comply with requirements of the building code.
    b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
3. Thermal Value:
    a. Framing: U-value equal to 0.36 or better.

2.03 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, 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: As indicated on drawings.

B. Glazing: As specified in Section 08 80 00 - Glazing.

C. Infill Panels: 1 inch, insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
    1. Core: Rigid polyurethane insulation.
    2. Exterior and Interior Finishes: Color to match existing panels at Pine River Elementary.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221/ASTM B221M.

B. Fasteners: Stainless steel.

C. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.

D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

E. Sealant for Setting Thresholds: Non-curing butyl type.

F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

G. Glazing Accessories: See Section 08 80 00.

2.05 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, 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 dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Install operating sash.

K. Set thresholds in bed of mastic and secure.

L. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

M. Install perimeter sealant in accordance with Section 07 90 05.

N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 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. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.05 PROTECTION

A. Protect installed products from damage during subsequent construction.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum windows with operating sash installed in storefront assemblies at Pine River Elementary School.

B. Factory glazing.

C. Operating hardware.

D. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Rough opening framing.

B. Section 07 27 02 - Air Barriers: Perimeter air and vapor seal between window frame and adjacent construction.

C. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

D. Section 08 43 13 - Aluminum-Framed Storefronts: Operable sash within framing system.

E. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.

B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

C. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

D. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2022.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

I. ASTM E283/283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

J. 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).

K. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2026.

L. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2017 (Reapproved 2023).

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, anchorage locations, and installation requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing 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 of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.08 WARRANTY

A. See Construction Manager's General Requirements for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.

D. Manufacturer Warranty: Provide 5-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 manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: "1150 SERIES HEAVY COMMERCIAL THERMAL" Manufactured by Winco Windows: www.wincowindow.com.

B. Aluminum Windows:
   1. EFCO, a Pella Company: www.efcocorp.com.
   2. Manko Window Systems, Inc: www.mankowindows.com.
   3. TRACO: www.traco.com.
   4. Wausau Window and Wall Systems: www.wausauwindow.com.
   5. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Frame Depth: 2 inches.
   2. Operable Units: Double weatherstripped.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   4. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   5. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   6. 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.
   7. Thermal Movement: Design to resist thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

B. Performance Requirements: Provide products that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 Class R Performance Grade 15.
   2. Grade Substantiation: Either AAMA Certification Label or independent test report itemizing compliance will constitute acceptable evidence of compliance.
   3. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   4. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 for Wind Zone 4, Basic Protection, for Large and Small Missile impact and pressure cycling at design wind pressure.
   5. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 pounds per square foot.
   6. Air Leakage: Maximum of 0.1 cu ft/min/sq ft at 6.27 pounds per square foot differential pressure, when tested in accordance with ASTM E283.
   7. Condensation Resistance Factor of Frame: 50, measured in accordance with AAMA 1503.
   8. Overall U-value, Including Glazing: 0.35, maximum, measured on the window size required for this project.
   9. Forced Entry Resistance: Tested to comply with ASTM F588 requirements for performance level 10 for specific window style required.

C. Project-Out Awning Type:
   1. Construction: Thermally broken.
   2. Provide insect screens.
   3. Glazing: As specified in Section 08 80 00.
   4. Exterior Finish: Class I natural anodized.
   5. Interior Finish: Class I natural anodized.

2.03 COMPONENTS

A. Frames: 2 inch wide x 2 inch deep profile, nominal wall thickness of 0.125 inch; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

B. Glazing: As specified in Section 08 80 00.

C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
   1. Hardware: Spring loaded steel pins; four per screen unit.
   2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
   3. Frame Finish: Same as frame and sash.

D. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

E. Fasteners: Stainless steel.

F. Sealant and Backing Materials: As specified in Section 07 90 05.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221, 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209, 5005 alloy, H12 or H14 temper.

C. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A123/A123M.

2.05 HARDWARE

A. Sash lock: Lever handle with cam type and manufactured from a white bronze alloy with a US25D brushed finish.

B. Operating arms shall consist of 4-bar stainless steel arms or equal.
   1. Acceptable Manufacturers:
      a. Advantage Manufacturing Corporation: www.advantagemanufacturing.com.
      b. Truth Hardware: www.truth.com.
   2. Material: Non-Magnetic stainless steel with brass shoe.
   3. Fasteners: Stainless steel #10 pan-head machine-threaded screws sized by manufacturer.

4. Description: Screw-adjusted slide shoe, non-handed.

C. Pulls: Manufacturer's standard type.

2.06 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41, clear anodic coating not less than 0.7 mils thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

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

B. Install window assembly in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Install sill and sill end angles.

F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Install operating hardware not pre-installed by manufacturer.

H. Install glass in accordance with requirements specified in Section 08 80 00.

I. Install perimeter sealant in accordance with requirements specified in Section 07 90 05.

J. Install “Emergency Exit” signage at all egress window units in compliance with the State of Michigan codes.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.

B. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Other doors to the extent indicated.

C. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Cylinders specified for doors in other sections.

1.02 RELATED SECTIONS

A. Section 06 20 00 - Finish Carpentry: Installation of hardware.

B. Section 08 11 13 - Hollow Metal Frames.

C. Section 08 14 16 - Flush Wood Doors.

D. Section 08 16 01 - Insulated Composite Doors.

E. Section 08 43 13 - Aluminum-Framed Storefronts

1.03 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
   2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
   3. Provide hardware for fire-rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.
   4. Hardware Supplier:
      a. Shall be an established firm dealing in contract builders' hardware. He must have adequate inventory, qualified personnel on staff and be located within 50 miles of the project. The distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant (AHC).
   5. Manufacturer:
      a. Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
      b. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

B. Pre-installation Meeting:
   1. Before hardware installation, General Contractor will request a hardware installation meeting be conducted on the installation of hardware; specifically that of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products, in conjunction with the hardware supplier for the project, shall conduct the meeting. Meeting to be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors. Meeting to address proper coordination and installation of hardware, per finish hardware schedule for this specific project, by using installation manuals, hardware schedule, templates, physical product samples and installation videos.
   2. When any electrical hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Design Professional.

3. Convene one week or more prior to commencing work of this Section.
4. The Hardware Supplier shall include the cost of this meeting in his proposal.

1.04 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. 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.

D. 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.

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.

1.05 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. 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.

C. 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, Design Professional, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. 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.

G. 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.

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.06 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".

1.07 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 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.

1.08 WARRANTY

A. General Warranty: Reference Construction Manager’s 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. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. Ten years for mortise locks and latches.
   2. Ten years for exit hardware.
   3. Twenty five years for manual surface door closer bodies.

1.09 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

2.01 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Construction Manager’s Requirements. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.02 HANGING DEVICES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 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. Acceptable Manufacturers:
      a. Hager Companies (HA).
      b. Ives Products (IVE).

2.03 CYLINDERS AND KEYING

A. Keying System: Each type of lock and cylinders to be factory keyed.
   1. Conduct specified "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: Key locks to Owner's existing systems:
      a. High School – Sargent.
      b. Middle School, Floyd Elementary and Pine River Elementary – Corbin Russwin.
      c. Bullock Creek Elementary – Schlage.

B. 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).

4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

C. Construction Keying: Provide temporary keyed construction cores.

2.04 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
   1. Acceptable Manufacturers:
      a. Falcon (FAL) – MA Series

2.05 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.

2.06 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. 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.
   2. 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.
   3. 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.
   4. 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.
   5. 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.
   6. 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.
   7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
   8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
   9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
   10. 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 panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
   1. Acceptable Manufacturers:
      a. Falcon (FAL) – 25 Series.

C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
   1. Provide keyed removable feature where specified in the Hardware Sets.
   2. Provide stabilizers and mounting brackets as required.
   3. Provide electrical quick connection wiring options as specified in the hardware sets.
   4. Acceptable Manufacturers

2.06 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. 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.
   2. 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.
   3. 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.
   4. 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.
   5. 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.
   6. 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.
   7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
   8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
   9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
   10. 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 panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
   1. Acceptable Manufacturers:
      a. Falcon (FAL) – 25 Series.

C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
   1. Provide keyed removable feature where specified in the Hardware Sets.
   2. Provide stabilizers and mounting brackets as required.
   3. Provide electrical quick connection wiring options as specified in the hardware sets.
   4. Acceptable Manufacturers:
      a. Falcon (FAL) - 4023 Series.

2.07 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 including installation and adjusting information on inside of cover.
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. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. 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 physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. 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 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. Acceptable Manufacturers:
      a. LCN (LCN) – 4050 Series.

2.08 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 certified 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. Acceptable Manufacturers:
      a. Ives (IVE)
      b. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified 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. Acceptable Manufacturers:
      a. Glynn Johnson (GLY).

2.09 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 NPFA 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. Acceptable Manufacturers:
1. National Guard Products (NG).
2. Pemko Manufacturing (PE).
3. Zero (ZER).

2.10 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.

2.11 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

3.01 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.

3.02 PREPARATION

A. Hollow Metal Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 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. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
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. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. 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.

3.04 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.05 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.

3.06 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.

3.07 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

Hardware Group No. 01
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	RESTROOM LOCK	MA641L OCCUPIED/VACANT DGM	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 02
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	MA561L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 03
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	CD-25-R-EO	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	RECESSED PULL	(BY DOOR MFR)		
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	SET	WEATHER SEAL	(BY FRAME MFR)		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-V3-223	A	ZER

Hardware Group No. 04
150A
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112XY		628	IVE
1	EA	REMOVABLE MULLION	KR4854 STAB		689	VON
2	EA	PANIC HARDWARE	CD-25-R-EO		626	FAL
1	EA	PANIC HARDWARE	CD-25-R-NL-OP		626	FAL
4	EA	CYLINDER	(MATCH EXISTING SYSTEM)		626	
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	↯	630	VON
2	EA	RECESSED PULL	(BY DOOR MFR)			
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)		689	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
1	SET	WEATHER SEAL	(BY FRAME MFR)			
2	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-V3-223		A	ZER
1	EA	ACCESS CONTROL	(RE-USE EXISITNG)	↯		

PRESENTING AN AUTHORIZED CREDENTIAL WILL ENERGIZE THE ELECTRIC STRIKE TO ALLOW ACCESS. FREE EGRESS IS ALWAYS ALLOWED.
COORDINATE SYSTEM OPERATION AND COMPONENT LOCATIONS WITH THE OWNER, THE ARCHITECT AND ALL RELATED TRADES.

Hardware Group No. 05
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	MA541L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 06
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	250DT	626	FAL
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" O	630-316	IVE
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN

Hardware Group No. 07
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PANIC HARDWARE	CD-25-R-NL	626	FAL
2	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

THE PANIC HARDWARE DEVICE MAY BE 'DOGGED' TO ALLOW PUSH/PULL OPERATION.

Hardware Group No. 08
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	MA561L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	OH STOP	90S	652	GLY
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

Hardware Group No. 09
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	MA541L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 10

227

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	MA581L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	MA541L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	OH STOP	90S	652	GLY

Hardware Group No. 12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CONST LATCHING BOLT	FB51T	630	IVE
1	EA	STOREROOM LOCK	MA581L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 13

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	MA541L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	OH STOP	90S	652	GLY
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

Hardware Group No. 14
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	MA581L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	OH STOP	90S	652	GLY
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

Hardware Group No. 15
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 5 X 4.5	652	IVE
2	EA	DUMMY PUSH BAR	250DT	626	FAL
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" O	630-316	IVE
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 16
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	MA581L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050A CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

Hardware Group No. 17
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	MA561L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 18
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	MA321 DG	626	FAL
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 19
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
2	EA	DUMMY PUSH BAR	250DT	626	FAL
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" O	630-316	IVE
2	EA	SURFACE CLOSER	4050A CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE

Hardware Group No. 20
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	AUTO FLUSH BOLT	FB32	630	IVE
1	EA	STOREROOM LOCK	MA581L DG	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	COORDINATOR	COR X FL	628	IVE
1	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	OH STOP	90S	652	GLY
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 21
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
2	EA	FIRE EXIT HARDWARE	F-25-V-L-LBR-DANE	626	FAL
2	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 22
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
2	EA	DUMMY PUSH BAR	250DT	626	FAL
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" O	630-316	IVE
2	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 23

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	FIRE EXIT HARDWARE	F-25-R-L-DANE	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050 RW/PA (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 24

123C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 5 X 4.5	652	IVE
2	EA	FIRE EXIT HARDWARE	F-25-C-EO-LBR	626	FAL
2	EA	SURFACE CLOSER	4050A EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL MAG HOLDER	SEM7850 12V/24V/120V	689	LCN

DOORS MAY BE HELD OPEN ELECTRONICALLY. UPON ACTIVATION OF THE BUILDING FIRE ALARM SYSTEM, THE DOORS WILL CLOSE AND POSITIVELY LATCH.
COORDINATE SYSTEM OPERATION AND COMPONENT LOCATIONS WITH THE OWNER, THE ARCHITECT AND ALL RELATED TRADES.

Hardware Group No. 25

227

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	F-25-R-L-NL-DANE	626	FAL
1	EA	CYLINDER	(MATCH EXISTING SYSTEM)	626	
1	EA	SURFACE CLOSER	4050A CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 08 14 16 - Flush Wood Doors.

B. Section 07 90 05 - Joint Sealers: Sealant and back-up material.

1.03 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 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 C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

I. GANA (GM) - GANA Glazing Manual; 2022.

J. GANA (SM) - GANA Sealant Manual; 2008.

K. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.

L. ITS (DIR) - Directory of Listed Products; Current Edition.

M. UL (DIR) - Online Certifications Directory; Current Edition.

N. ICC (IBC) - International Building Code; 2015.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

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

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Construction Manager's General Requirements for additional warranty procedures.

B. Laminated Glass: Provide a five (5) year warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
   1. Thompson I.G., LLC: www.thompsonig.com.
   2. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
   3. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Float Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Guardian Glass, LLC: www.guardianglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

C. Laminated Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Thompson I.G., LLC; Laminated Glass: www.thompsonig.com.
   3. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 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 FT - Fully Tempered Type: Complies with ASTM C1048.
   3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
   4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

2.03 GLAZING UNITS

A. Type G-1 - Monolithic Safety Glazing: Non-fire-rated.
   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 the drawings.
   2. Type: Fully tempered float glass as specified.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

B. Type G-2 - Wired Glass: Flat glass with embedded wire mesh. Single, annealed, wired glass with surface applied film.
   1. Applications: Glazing in fire-resistance-rated door assembly.
   2. Form: Form 1 - Wired glass, polished both sides; ASTM C1036.
   3. Mesh: M1 - Diamond; ASTM C1036.
   4. Tint: Clear, Class 1.
   5. Glass Type: Annealed.
   6. Thickness: 5/16 inch, nominal.

2.04 GLAZING COMPOUNDS

A. Type GC-1- 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.

B. Manufacturers:
   1. Bostik Inc: www.bostik-us.com/#sle.
   2. Pecora Corporation: www.pecora.com/#sle.
   3. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.05 GLAZING 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 Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.

E. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color Grey.

F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

3.03 INSTALLATION, GENERAL

A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

3.04 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)

A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.

B. Locate and secure glazing pane using glazers' clips.

C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.05 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.06 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.

3.07 SCHEDULE

A. Flush Wood Door Glazing - Interior:
   1. Fire-rated openings: G-2.
   2. Unrated openings: G-1.

END OF SECTION

SECTION 09 05 61

EXISTING FLOORING REMOVAL AND PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
   1. Resilient tile and sheet.
   2. Carpet tile.

B. Sawcutting.

C. Preparation of existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-In-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.

B. Section 09 65 00 - Resilient Flooring.

C. Section 09 68 13 - Tile Carpeting.

1.03 REFERENCES

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2021.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 2020.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.

D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2018.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of the Work with the Construction Manager and Owner to verify that alternate building egress routes are in place.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Visual Observation Report: For existing floor coverings to be removed.

C. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and pH limits and test methods.
   2. Manufacturer's required bond/compatibility test procedure.

D. Testing Agency's Report: Include:
   1. Description of areas tested; include floor plans and photographs if helpful.
   2. Summary of conditions encountered.
   3. Moisture and pH test reports.
   4. Copies of specified test methods.
   5. Recommendations for remediation of unsatisfactory surfaces.
   6. Submit report directly to Owner.
   7. Submit report not more than two business days after conclusion of testing.

E. Adhesive Bond and Compatibility Test Report.

F. Copy of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

1.06 QUALITY ASSURANCE

A. Moisture and pH testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Contractor may perform adhesive and bond test with his 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 Owner when specified ambient conditions have been achieved and when testing will start.

1.07 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.

1.08 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.

PART 2 PRODUCTS

2.01 MATERIALS

A. 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.

B. 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.

C. 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 pH found, and suitable for adhesion of flooring without further treatment.
   1. Thickness: 1/8 inch, maximum.
   2. If testing agency recommends any particular products, use one of those.
   3. Products:
      a. ARDEX Engineered Cements; ARDEX MC ULTRA, with ARDEX FEATHERFINISH: www.ardexamericas.com.
      b. Floor Seal Technology, Inc; MES 100, with ARDEX K-15 or Mapei Ultraplan 1 Plus: www.floorseal.com.
      c. Koster American Corporation; Koster VAP I 2000, with Koster SL Premium overlay: www.kosterusa.com.

d. ProSpec, an Oldcastle brand; Moisture Guard Max: www.prospec.com.
e. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer and Sikafloor Self-Leveling Moisture Tolerant Resurfacer: www.sikafloorusa.com.
f. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

PART 3 EXECUTION

3.01 REMOVAL OF EXISTING FLOOR COVERINGS

A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.

B. Dispose of removed materials in accordance with local, state, and federal regulations and as specified.

3.02 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.

3.03 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.

3.04 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.

D. 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.

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 any test value exceeds 75 percent relative humidity.

F. Report: Report the information required by the test method.

3.05 PH 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. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.

C. Use a wide range pH paper, its associated chart, and distilled or deionized water.

D. 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 pH paper into the water, remove it, and compare immediately to chart to determine pH reading.

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 any test value is over 10.

3.06 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.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.08 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

3.09 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Gypsum wallboard.

D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 06 10 00 - Rough Carpentry: Exterior wall sheathing.

C. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing 2020.

C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

F. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

G. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2024.

J. 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.

K. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

L. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

M. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.

N. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

O. ASTM C1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2024.

P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

Q. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

R. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2024.

S. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2024.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino: www.marinoware.com.

B. Partition Wall Studs: Non-Loadbearing Framing System Components; ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Thickness: 20 gauge.
   2. Studs: "C" shaped with flat or formed webs with knurled faces.

C. Studs and Headers at Wall Openings: Heavy-duty, ASTM A653:
   1. Thickness: 16 gauge.
   2. Dimensions: 3-5/8 x 3 x 2-1/16 x 3/4 inch and 6 x 3 x 2-1/4 x 3/4 inch.
   3. Header Brackets: 14 gauge, 3-1/2 x 3-1/16 x 2 inch.

D. Runners: U shaped, sized to match studs.

E. 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 North American Specification for the Design of Cold-Formed Steel Structural Members.
   2. Material: ASTM A653 steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems of fire rating and movement required.
   4. Deflection and Firestop Track:
      a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
      b. Acceptable Products:
         1) "Posi Clip" by Fire Trak Corporation.
         2) "The System" by Metal-Lite, Inc.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com.
   3. National Gypsum Company: www.nationalgypsum.com.
   4. Temple-Inland Building Product by Georgia-Pacific, LLC: www.temple.com.
   5. USG Corporation: www.usg.com.

B. Type A Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
4. Thickness:
    a. Vertical Surfaces: 5/8 inch.
    b. Ceilings: 5/8 inch.

C. Type B Backing Board for Wet Areas: One of the following products:
1. Application: Surfaces in wet areas including shower ceilings.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panelsmwith glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    a. Thickness: 5/8 inch.
    b. Products:
        1) PermaBASE Building Products, LLC provided by National Gypsum Company; PermaBase Cement Board: www.goldbondbuilding.com.
        2) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 5/8 in.: www.usg.com.
4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
    a. Regular Type: Thickness 5/8 inch.
    b. Products:
        1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com.
        2) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Tile Backer: www.goldbondbuilding.com/.
        3) USG Corporation; Durock Brand Glass-Mat Tile Backerboard SGX 5/8 in.: www.usg.com.

D. Type C Abuse-Rated Wallboard: Tested to Level 2 soft-body and Level 1 hard-body impact in accordance with ASTM C1629.
1. Application: All interior wall surfaces within 8’-0” of finish floor.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
4. Type: Fire-resistance rated Type X, UL or WH listed.
5. Thickness: 5/8 inch.
6. Edges: Tapered.
7. Products:
    a. National Gypsum Company; Gold Bond Hi-Abuse Brand XP Wallboard.
    b. Temple-Inland Building Product by Georgia-Pacific, LLC.
    c. USG Corporation.

2.04 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
3. Manufacturers - Finishing Accessories:
    a. Same manufacturer as framing materials.

B. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Glass-Mat Faced Drywall Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Paper-Faced Drywall Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Powder-type vinyl-based joint compound.

C. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

D. Screws for Attachment to Steel Members From 0.033 to 0.112 Inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

E. Nails for Attachment to Wood Members: ASTM C514.

F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

A. Studs: Space studs at 16 inches on center.
   1. Extend partition framing to structure in all locations.
   2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
   3. 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.

B. Openings: Reinforce openings as specified above for weight of doors or operable panels, using special shapes.

C. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall mounted cabinets.
   3. Wall mounted door hardware.
   4. Plumbing fixtures.
   5. Toilet partitions.
   6. Toilet accessories.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Installation on Metal Framing: Use screws for attachment of all gypsum board.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as directed.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.05 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, bedded with powder-type vinyl-based joint compound and finished with powder-type vinyl-based joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. 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.

E. Where Level 5 finish is indicated, skim-coat entire surface after have been properly treated; achieve a flat and tool mark-free finish.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.07 SCHEDULE

A. Type A: All interior vertical and horizontal surfaces and bulkheads more than 8 feet above finished floor, unless noted otherwise.

B. Type B: All interior vertical and horizontal surfaces at wet areas including ceiling work at showers.

C. Type C: All interior vertical surfaces up to 8 feet, unless noted otherwise.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 09 54 21 - Metal Pan Ceilings: Ceilings at locker rooms.

B. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.

C. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2022.

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

E. UL (FRD) - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. 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.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Construction Manager’s General Requirements, for additional provisions.
   2. Extra Acoustical Units: Furnish quality of full-size units equal to 2.0 percent of amount installed for each ceiling type.

1.06 QUALITY ASSURANCE

A. Provide ceiling panel units and suspension components by a single manufacturer.

B. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to gypsum board, light fixtures, mechanical systems, and electrical systems.

C. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Acoustical Unit 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. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

1.08 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Type 'A' - Acoustical Panels: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
   1. Size: 24 x 24 inches.
   2. Thickness: 5/8 inches.
   3. Composition: Wet felted.
   4. Light Reflectance: 82 percent, determined as specified in ASTM E1264.
   5. NRC Range: 50 to 60, determined as specified in ASTM E1264.
   6. Ceiling Attenuation Class (CAC): 33, determined as specified in ASTM E1264.
   7. Edge: Reveal edge.
   8. Surface Color: White.
   9. Surface Pattern: Non-directional fissured.
   10. Products:
      a. "CORTEGA" manufactured by Armstrong World Industries: www.armstrong.com.
      b. "BAROQUE" manufactured by CertainTeed Corporation: www.bpb-na.com.
      c. "RADAR" manufactured by USG Corporation: www.usg.com.

D. Type 'B' - Acoustical Panels: High-density ceramic-bonded mineral fiber with scrubbable finish, ASTM E1264 Type XX, with the following characteristics:
   1. Size: 24 x 24 inches.
   2. Thickness: 5/8 inches.
   3. Composition: Wet felted.
   4. Light Reflectance: 82 percent, determined as specified in ASTM E1264.
   5. NRC Range: 50 to 60, determined as specified in ASTM E1264.
   6. Ceiling Attenuation Class (CAC): 40, determined as specified in ASTM E1264.
   7. Edge: Square.
   8. Surface Color: White.
   9. Surface Pattern: Unperforated.
   10. Surface Finish: Factory-applied plastic.
   11. Products:
      a. "CERAMAGUARD FINE FISSURED" manufactured by Armstrong World Industries: www.armstrong.com.
      b. "RADAR CERAMIC ClimaPlus" manufactured by USG Interiors, Inc: www.usg.com.
      c. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical units.

B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: White painted.

2.03 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 material and finish as grid.
   1. Angle Molding: Provide L-shaped, for mounting at same elevation as face of grid.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

C. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, 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. Layout pattern in room to avoid any tile cuts less than 3 inches.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. 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.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

3.04 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. Make field cut edges of same profile as factory edges.

F. Where round obstructions occur, provide preformed closures to match perimeter molding.

G. Install hold-down clips on panels within 20 ft. of an exterior door and throughout High School Toilet Room ceilings.

3.05 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.

3.06 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

END OF SECTION

SECTION 09 54 21

METAL PAN CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal pan ceilings.

B. Suspended metal support system and perimeter trim.

1.02 RELATED REQUIREMENTS

A. Section 09 51 00 - Acoustical Ceilings.

B. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.

C. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2019 (Reapproved 2025).

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

A. 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.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

D. See Construction Manager’s General Requirements, for additional provisions.

1. Extra Acoustical Units: Furnish quality of full-size units equal to 2.0 percent of amount installed for each ceiling type.

1.06 QUALITY ASSURANCE

A. Provide ceiling panel units and suspension components by a single manufacturer.

B. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to gypsum board, light fixtures, mechanical systems, and electrical systems.

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 work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

1.08 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.

B. Suspension Systems:
   1. Same as for acoustical units.

2.02 ACOUSTICAL PANELS

A. Acoustic Metal Panels: Basis-Of-Design: Metalworks™ SecureLock™ manufactured by Armstrong World Industries: Tamper-resistant ceiling system from galvanized steel panels, with the following characteristics:
   1. Size: 24 x 24 inches.
   2. Thickness: 18 gauge.
   3. Composition: Electrogalvanized steel; factory applied powder coating.
   4. Light Reflectance: 75 percent.
   5. NRC Range: 0.80 with 1 inch fiberglas infill.
   6. Edge: Square.
   7. Surface Pattern: Perforated (P4).
   8. Color: White.
   9. Suspension System: Heavy duty exposed grid with hold down clips and compression struts.

2.03 SUSPENSION SYSTEMS

A. Manufacturers:
   1. Same as for acoustical units.

B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Basis-Of-Design: “Heavy-Duty Prelude XL” suspension system as manufactured by Armstrong World Industries.
   2. Profile: Tee; 15/16 inch wide face.
   3. Finish: White painted.

2.04 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 (2 mm) galvanized steel wire.

C. Hold-Down Clips: Hold down clips, compression struts, and security screws.

D. Perimeter Moldings: Same material and finish as grid.
   1. Angle Molding: L-shaped molding for mounting at same elevation as face of grid.

E. Touch-up Paint: Type and color to match acoustical and grid units.

F. 1” Fiberglass infill Panel, Item# 8200T10.

G. Access Door: Basis-Of-Design: “Access Door – 18 gauge” as manufactured by Armstrong World Industries.
   1. 24” x 24” Exit Panel, Perforated, Item# 5965P4WH

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

C. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, 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 ceiling plan. Layout pattern in room to avoid any tile cuts less than 3 inches.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

F. 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.

G. 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.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

3.03 INSTALLATION – METAL PANS

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

B. Fit 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 units after above-ceiling work is complete.

E. Install units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips and compression struts.

I. Install access door where noted on drawings.

3.04 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.

3.05 ADJUSTING AND CLEANING

A. Replace damaged panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer’s instructions for cleaning and touch up of minor finish damage.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 05 61 - Existing Flooring Removal and Preparation.

B. Section 09 68 13 - Tile Carpeting.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.

C. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2022.

D. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2021).

E. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.

F. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.04 SUBMITTALS

A. See Construction Manager's General 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 Design Professional's initial selection.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Construction Manager's General Requirements, for additional provisions.
   2. Extra Flooring Material: 35 square feet of each type and color.
   3. Extra Wall Base: 12 linear feet of each type and color.

1.05 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.

1.06 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. Protect roll materials from damage by storing on end.

1.07 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
   2. Size: 12 x 12 inch.
   3. Thickness: 0.125 inch.
   4. Pattern: Marbleized.
   5. Manufacturers:
      a. Armstrong World Industries, Inc; Product "IMPERIAL TEXTURE": www.armstrong.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 LUXURY VINYL TILE FLOORING

A. Description: A layered construction consisting of a tough, clear, vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.
   1. Minimum Requirements: Comply with ASTM F1700, “Standard Specification for Solid Vinyl Tile", Class III, Type A & B – Embossed Surface.
   2. Pattern and Color: To be selected by Design Professional from manufacturer’s full color range.
   3. Size: Varies from 18 inches by 36 inches.
   4. Wear layer thickness: 40 mil.
   5. Thickness: 0.096 inches.
   6. Pattern: Block weave layout.
   7. Manufacturers:
      a. Basis-of-Design: AMTICO COLLECTION – “ABSTRACT” by Mannington Commercial: www.manningtoncommercial.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.03 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Height: 4 inch.
   3. Thickness: 0.125 inch thick.
   4. Finish: Satin.
   5. Length: Roll.
   6. Color: Color as selected from manufacturer's standards.
   7. Manufacturers:
      a. Burke Flooring: www.burkemercer.com.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.04 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Same material as flooring.

D. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 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. 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.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is cured.

E. Clean substrate.

F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

C. Install square tile to running bond pattern. Allow 1/2 full size tile width at room perimeter.

3.05 INSTALLATION - LUXURY VINYL TILE FLOORING

A. Review layout of flooring in each area with Design Professional to determine pattern of planks and tiles before installation.

B. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.

3.06 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

3.08 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 67 00

RESINOUS FLOOR COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnish all necessary materials, labor and equipment required to prepare designated floor area and install Resinous Flooring, as specified herein and as indicated on the Drawings.
   1. Refer to the Room Finish Schedule on the Drawings for locations of Resinous Flooring.

1.02 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. All resinous floor coatings and accessories specified in this Section shall be submitted as a single package as practicable. Separate submittals for each system or product may **NOT** be acceptable.

C. Do **NOT** submit MSDS or SDS sheets with product data submittal. Design Professional is **NOT** responsible for review of this information. Submittals that include MSDS or SDS data sheets may be returned as rejected.

D. Product Data: Submit manufacturer's specification or specific products of the resinous flooring, including physical properties and performance properties and all tests described herein. Each individual component of the system will be evaluated on the basis of these standards. For any of the tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data from an independent test laboratory tested according to the referenced standard. Manufacturer's standard color chart shall also be submitted and must afford the Design Professional color selection from at least 12 standard colors.

E. The industrial resinous flooring contractor shall submit a 6" x 6" system sample for verification purposes and finish texture approval.

F. Contractor Experience: The industrial resinous specialist shall furnish a list of three (3) projects using either specified material or another material pre-approved for this project that they have installed during the last five (5) years. Information shall include project name, square footage, contract name with Owner's address and phone number. Also, the industrial resinous flooring specialist shall furnish resumes detailing the experience of key project personnel including supervisors and technicians.

G. Submit warranty as specified herein.

H. Submit pre-installation meeting minutes.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Obtain resinous flooring materials from a single manufacturer.

B. Applicator's Qualifications: Installation shall be performed by an industrial resinous flooring specialist with skilled mechanics having not less than three (3) years of satisfactory experience in the application of the type and complexity of system as specified in this section. The industrial resinous flooring specialist shall be approved in writing by the manufacturer of the resinous flooring as specified herein.

C. Submit warranty as specified herein.

D. Conduct a pre-installation meeting at the project site prior to installation of resinous floor coating. Review the environmental requirements, protection of surfaces not scheduled to be coated, surface preparation, application methods and concerns, repair requirements, field quality control, cleaning, protection of completed flooring, one year inspection and coordination with other work.
   1. Attendees:
      a. Owner (not mandatory).
      b. Design Professional.
      c. General Contractor.
      d. Installing Contractor.
   2. Agenda:
      a. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
      b. Review details of wall bases.

3. Review manufacturer's written instructions for installing resinous flooring systems.
4. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, base details, and so forth.

1.04 MATERIAL DELIVERY, HANDLING AND STORAGE

A. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
   1. Product Name.
   2. Manufacturer's Name.
   3. Component designation (A or B, etc.).
   4. Ratio of component mixture.

B. Provide equipment and personnel to handle the materials by methods which prevent damage.

C. The resinous flooring specialist shall promptly inspect all direct jobsite deliveries to assure that quantities are correct and that materials comply with requirements and are not damaged.

D. The resinous flooring specialist shall be responsible for all materials furnished by him, and he shall replace, at his own expense, all such material that is found to be defective in manufacturing or that has become damaged in transit, handling or storage.

E. Store materials in accordance with manufacturer's instructions, with seals and labels intact and legible.

1.05 JOB CONDITIONS

A. The resinous flooring specialist shall visit jobsite prior to beginning the application of the resinous flooring to evaluate substrate condition, including substrate moisture content, and the extent of repairs required, if any. Concrete subfloors shall be tested to verify that the moisture content of the substrate doors do not exceed that as recommended by the manufacturer.

B. The resinous flooring specialist should exercise care during surface preparation and system application to protect surrounding substrates and surfaces, as well as in place equipment. The resinous flooring specialist shall use his discretion as to the physical means used for preparation and protection. Any costs incurred for resultant damage from negligence or inadequate protection shall be the sole responsibility of the resinous flooring specialist.

C. All drains in the installation area must be working and raised or lowered to the actual finish elevation of the resinous flooring system.

D. Project area shall be free of other trades during floor installation, and for a period of 24 hours upon completion.

E. Where natural ventilation is inadequate, provide ventilation by use of fans or other devices.

F. Maintain lighting at a minimum uniform level of 50-60 foot candles in all areas where resinous flooring system is being installed. It is the recommendation of the Design Professional that permanent lighting be in place and working during the installation.

1.06 WARRANTY

A. The resinous floor specialist shall furnish a standard guarantee of the resinous flooring for a period of one (1) year after installation. This labor guarantee shall include loss of bond and wear-through in the tile substrate, through normal wear and tear.

B. The manufacturer shall warrant that the product meets all published standards.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products of the following manufacturers are approved provided compliance with all technical requirements as specified herein:
   1. Tnemec Company, Kansas City, MO.

2.02 MATERIALS

A. Filler and Vertical Base:
   1. Tnemec Series N283, “Coving Resin”, 100% solids (mixed), a clear, thixotropic binder resin.

a. When using Series N283 for building vertical troweled wall applications an aggregate similar to 30/50 mesh silica sand, Series 222 or 223 Quartz must be used.
b. Number of Components: Two (2).

B. Primer:
1. Tnemec Series N222, "Deco-Tread", 100% solids (mixed), penetrating polyamine cured resinous primer.
a. Recommended Dry Film Thickness: 4.0 to 6.0 mils per coat; or as otherwise recommended by the manufacturer.
b. Number of Components: Two (2).

C. Resinous Flooring:
1. Tnemec Series N222, "Deco-Tread", broadcast laminated epoxy coating system, 100% solids (mixed), quartz filled polyamine epoxy.
a. Recommended Dry Film Thickness: 15.0 to 20 mils per coat. Requires two broadcast applications each. Broadcast to rejection with Tnemec Series 222Q ChromaQuartz.
b. Number of Components: Three (3). Two liquid and one-color quartz.
c. Quartz Broadcast: Tnemec Series 222Q “ChromaQuartz”, multi-colored appearance.

D. Grout Coat:
1. Tnemec Series 284, "Deco-Clear", 100% solids (mixed), modified polyamine epoxy.
a. Recommended Dry Film Thickness: 8.0 to 16.0 mils per coat; or as otherwise recommended by the manufacturer.
b. Number of Components: Two (2).

E. Glaze Coat:
1. Tnemec Series 285, "Satinglaze", two component, 92% solids, polyamine resinous.
a. Recommended Dry Film thickness: 4.0 to 6.0 mils, per coat; or as otherwise recommended by the manufacturer.
b. Number of Components: Two (2).
2. Recommended Dry Film Thickness: 8.0 to 10.0 mils per coat; or as otherwise recommended by the manufacturer.
3. Number of Components: Two (2).

F. Provide stainless steel termination strips and all accessories as required for a complete installation in every respect. Termination strips shall be provided where resinous flooring abuts adjacent floor finish materials. Termination strip style shall be as recommended by the manufacturer.

G. Provide heavy non-slip surface in all Toilet Rooms. Obtain Design Professional’s approval of finishes prior to installation.

H. Sawcut resinous flooring directly over control joints and expansion joints in existing tile flooring substrate. Fill sawcuts with self-leveling traffic grade sealant as specified in Section 07 90 05.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Preparation: Thoroughly and uniformly abrade/grind existing tile, existing terrazzo, and/or concrete surfaces to replicate a surface profile, ICRI CSP 2-3 Surface Profile.

B. Remove loose or delaminated tile, grout, and setting bed. Fill voids in tile substrate using Tnemec Series N283 Coving Resin.

C. Fill grout joints level with prepared masonry surface using Tnemec Series N283 Coving Resin.

3.02 INSTALLATION

A. Install all items at thicknesses and in strict accordance with the manufacturer's written installation instructions.

B. Provide all items as required for a complete and watertight installation in every respect.

C. Coordinate the adjustment of existing floor drains with the Division 22 Plumbing Contractor.

D. Provide vertical integral bases. Refer to Drawings for height.

E. General: Apply components of resinous coating system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface at the specified thickness.
   1. Coordinate application of components to provide optimum adhesion of resinous floor/wall system to substrate and intercoat adhesion.
   2. At substrate control, isolation, and expansion joints, provide joint as necessary in resinous flooring in compliance with manufacturer's directions and engineering details for each joint type.

F. Sawcut resinous flooring directly over control joints and expansion joints in concrete slab on grade substrate. Fill sawcuts with self-leveling traffic grade sealant as specified in Section 07 92 00.

3.03 CURING

A. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during curing processes.
   1. Temperatures shall be maintained at 70°F - 80°F if at all possible.
   2. Water leaks must be prevented as they will compromise component's ability to set properly; water drips may compromise or stain finishes.
   3. Steam or any airborne contamination will adversely affect curing.

3.04 CLEANING

A. Work area shall be left clean with all trash, equipment, and leftovers removed.

B. Floor and walls may be cleaned prior to final inspection, providing complete curing has taken place. Refer to Product Data Sheets for curing information for each product. Generally, non-chlorinated detergents should be used for the first month after curing is complete.

C. For optimum coating performance and cleanability, manufacturer recommends the use of liquid soaps to prevent caking on resinous surfaces caused by bar soaps.

D. Follow manufacturers written installation instructions.

3.05 PROTECTION

A. Protection from damage and wear during the construction process is recommended. Comply with manufacturer's recommendations for protective materials and their method of application. Remove temporary protection prior to final inspection. Protection from welding, impact from heavy tools and other abuse is anticipated, the contractor doing the work shall take extra care in protecting the floor with impact resistance and if necessary, flame-resistant coverings. Removal of any temporary or protective material is not the responsibility of the Installer.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, loose laid with edges and control grid adhered.

B. Matching roll carpet for direct glue installation on base.

1.02 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

C. CRI 104 - Standard for Installation of Commercial Carpet; 2018.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Samples: Submit four carpet tiles illustrating color and pattern design for each carpet color selected.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum five years experience.

1.05 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Shaw Contract Carpets; Product: ”Altered – Glitch Tile”: www.shawcontract.com.

2.02 MATERIALS

A. Carpet Tile:
   1. Multi-level pattern loop; solution dyed nylon.
   2. Tile Size: 9 x 36 inch, nominal.
   3. Gage: 1/12.
   4. Color: To be selected by Design Professional.
   5. Backing Material: Ecoworx®.

B. Roll Carpet: Same manufacturer, type, color and pattern, and face fiber characteristics as carpet tile, manufactured in same color dye lot as tile.

2.03 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: Vinyl, color as selected.

C. Adhesives: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions and CRI Carpet Installation Standard.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in Brick pattern, set parallel to building lines.

F. Locate change of color or pattern between rooms under door centerline.

G. Adhere carpet tile to substrate along centerline of rooms, at perimeter of rooms, where tiles are cut, and at 15 foot intervals throughout rooms. Lay remainder of tile dry over substrate.

H. Trim carpet tile neatly at walls and around interruptions.

I. Complete installation of wall base and edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 78 00

INTERIOR WALL PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stainless steel wall panels.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealers: Sealing joints between panels and adjacent walls, ceilings and floors.

1.03 REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

B. FM (AG) - FM Approval Guide; Current Edition.

C. NSF 2 - Food Equipment; 2025.

D. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Submit manufacturer's descriptive literature for each specified product. Include anchorage devices specific to project substrate types.

C. Shop Drawings: Submit elevations for each application and location. Indicate details of joints and attachments.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.

B. Installer Qualifications: Company specializing in installing work of the type specified in this section, and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in manufacturer's original packaging, marked with manufacturer's product identification.

B. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 METAL INTERIOR WALL PANELING

A. Metal Wall Panel System:
   1. Applications: Wall cladding.
   2. Panel Size: 4 by 8 feet.
   3. Thickness: 0.035 inch.
   4. Finish: As selected by Architect from manufacturers standard line.

B. Materials:
   1. Stainless Steel Sheet: ASTM A666/A666M Type 304 commercial grade, No. 4 finish.
   2. Finish Hardware: Manufacturer's standard.

C. Finishes:
   1. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

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

B. Insulate to prevent electrolysis between dissimilar metals.

C. Use anchoring devices appropriate for equipment and expected usage.

D. Apply panels to wall with vertical joints plumb and horizontal joints level and pattern aligned with adjoining panels.

E. Seal joints at wall base and between panels with approved sealant to prevent moisture intrusion.

F. Remove excess sealant after paneling is installed and prior to curing.

3.03 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean panel faces using cleaning agents and methods recommended by manufacturer to remove soiling.

3.04 PROTECTION

A. Protect paneling from subsequent construction operations.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Exposed surfaces of structural steel, including steel lintels and ledge angles.
   3. Mechanical and Electrical:
      a. In finished areas, paint all 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. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
      d. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      e. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   7. Floors, unless specifically so indicated.
   8. Ceramic and other tiles.
   9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   10. Glass.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shop-primed items.

B. Section 06 20 00 - Finish Carpentry: Wood items to be stained.

C. Section 09 90 01 - Dryfall Painting

D. Section 09 96 00 - High Performance Coatings

E. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Color coding scheme for items to be painted under this section.

F. Section 26 05 53 - Identification for Electrical Systems: Color coding scheme for items to be painted under this section.

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

B. The terms "Latex" and/or "Acrylic Latex", when used in this Specification Manual, shall refer to paint that is stabilized with Acrylic Resin and shall be universally defined within these Documents as "100% Acrylic Resin". Vinyl Acrylic paints are not acceptable.

1.04 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; 2019.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2022.

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

E. SSPC V1 (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; 2024.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide complete list of all 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 manufacturer's paper chip samples illustrating range of colors and textures available for each surface finishing product scheduled.

D. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on coated card stock, 8 x 10 inch in size.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Paint and Coatings: 1 gallon of each color and type; store where directed.
   2. Label each container with color and type in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

1.07 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.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

B. Paints:
   1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
   2. Glidden Professional: www.gliddenprofessional.com.
   3. Benjamin Moore & Co: www.benjaminmoore.com.
   4. PPG Architectural Finishes, Inc: www.ppgpaints.com.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. 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 coating material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings 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. Architectural coatings VOC limits of State in which the project is located.
   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.

D. Chemical Content: The following compounds are prohibited:
   1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

E. Flammability: Comply with applicable code for surface burning characteristics.

F. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Design Professional after award of contract.
   2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
   3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 PAINT SYSTEMS - EXTERIOR

A. Concrete/Masonry, Opaque, Elastomeric High Build Coating, 3 Coat:
   1. One coat of block filler: "LOXON SURFACER" by Sherwin Williams.
   2. Semi-Gloss: Two coats of Elastomeric High Build Coating; "ConFlex XL - A5-400 SERIES" by Sherwin Williams.

B. Existing Painted Masonry/Concrete, Opaque, Latex, 2 Coat:
   1. One coat of latex primer sealer: "LOXON SURFACER" by Sherwin Williams.
   2. Semi-Gloss: One coat of Elastomeric High Build Coating; "ConFlex XL - A5-400 SERIES" by Sherwin Williams.

C. Ferrous Metals, Unprimed, Acrylic Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

D. Ferrous Metals, Primed, Acrylic Latex, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

E. Galvanized Metals, Acrylic Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

2.04 PAINT SYSTEMS - INTERIOR

A. Existing Painted Wood, Opaque, Acrylic Latex, 2 Coat:
   1. Semi-gloss: Two coats of acrylic latex enamel.
   2. Eggshell: Two coats of acrylic latex enamel.
   3. Flat: Two coats of acrylic latex enamel.

B. Wood, Transparent, Polyurethane, No Stain:
   1. One coat sealer.
   2. Satin: Two coats of polyurethane.

C. Wood, Transparent, Polyurethane, Stain:
   1. Filler coat (for open grained wood only).
   2. One coat of stain.
   3. One coat sealer.
   4. Satin: Two coats of polyurethane.

D. Concrete/Masonry, Opaque, Acrylic Latex, 3 Coat:
   1. One coat of block filler.
   2. Semi-gloss: Two coats of acrylic latex enamel.

E. Existing Painted Concrete/Masonry, Opaque, Acrylic Latex, 2 Coat:
   1. One coat of latex primer sealer.
   2. Semi-gloss: One coat of acrylic latex enamel.

F. Ferrous Metals, Unprimed, Acrylic Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

G. Existing Painted Ferrous Metals, Acrylic Latex, 2 Coat:
   1. Touch-up with primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

H. Ferrous Metals, Primed, Acrylic Latex, 2 Coat:
   1. Touch-up with latex primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

I. Galvanized Metals, Acrylic Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of acrylic latex enamel.

J. Gypsum Board/Plaster, Acrylic Latex, 3 Coat:
   1. One coat of primer sealer.
   2. Semi-gloss: Two coats of acrylic latex enamel.
   3. Eggshell: Two coats of acrylic latex enamel.
   4. Flat: Two coats of acrylic latex enamel.

K. Existing Painted Gypsum Board/Plaster, Acrylic Latex, 2 Coat:
   1. Semi-gloss: Two coats of acrylic latex enamel.
   2. Eggshell: Two coats of acrylic latex enamel.
   3. Flat: Two coas of acrylic latex enamel.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. If substrate preparation is the responsibility of another installer, notify Design Professional 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 are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing coatings that exhibit surface defects.

D. Remove or mask 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. 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. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

I. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

J. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.

K. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

L. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

M. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

N. Shop-Primed Steel Surfaces to be Finish Painted: 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.

O. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 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 instructions.

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. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. Design Professional will provide field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS

A. Concrete, Concrete Block Masonry: Finish all surfaces exposed to view.
   1. Interior: Acrylic latex, semi-gloss.

B. Gypsum Board: Finish all surfaces exposed to view.
   1. Interior Ceilings and Bulkheads: Acrylic latex, flat.
   2. Interior Walls: Acrylic latex, eggshell.

C. Plaster: Finish all surfaces exposed to view.
   1. Interior Walls and Ceilings:

D. Wood: Finish all surfaces exposed to view.
   1. Interior trim and frames: Acrylic latex, semi-gloss.

E. Wood Doors: Factory-finished.

F. Steel Door Frames: Finish all surfaces exposed to view; Acrylic latex, semi-gloss.

G. Steel Fabrications: Finish all surfaces exposed to view.
   1. Exterior: Acrylic latex, gloss; finish all surfaces, including concealed surfaces, before installation.
   2. Interior: Acrylic latex, semi-gloss.

H. Steel - Exposed Deck, Structural Steel, Etc.: Finish all surfaces exposed to view.
   1. Touch-up shop primer.

2. Two coats alkyd dryfall, flat.

I. Galvanized Steel: Finish all surfaces exposed to view.
   1. Exterior: Acrylic latex, semi-gloss.
   2. Interior: Acrylic latex, semi-gloss.

J. Shop-Primed Metal Items: Finish all surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of lintels.
      b. Mechanical equipment.
      c. Electrical equipment.
   2. Exterior: Acrylic latex, semi-gloss.
   3. Interior: Acrylic latex, semi-gloss.

K. Pipe and Duct Insulation Jackets: Finish all surfaces exposed to view; flat.

END OF SECTION

SECTION 09 90 01

DRYFALL PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paint.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

1. Exposed surfaces of existing steel fabrications, lintels and ledge angles at new work locations.
2. Mechanical and Electrical:
    a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coatings

B. Section 20 00 00 - Basic Mechanical Requirements.

C. Section 22 05 53 - Identification for Plumbing Piping and Equipment.

D. Section 26 05 53 - Identification for Electrical Systems: Painted identification.

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 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; 2019.

C. SSPC V1 (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; 2024.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide data on paint products, including VOC content.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

1.07 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.

1.08 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. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for polyurethane Finishes: 65 degrees F for interior or 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

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Base Manufacturer: The Sherwin-Williams Company: www.sherwin-williams.com.
   2. Glidden Professional: www.gliddenprofessional.com.
   3. Benjamin Moore & Co: www.benjaminmoore.com.
   4. PPG Architectural Finishes, Inc: www.ppgaf.com.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each coating material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings 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.
   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.

D. Chemical Content: The following compounds are prohibited:
   1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

E. Flammability: Comply with applicable code for surface burning characteristics.

F. Colors: To be selected from manufacturer's full range of available colors by Design Professional

2.03 INTERIOR DRYFALL PAINT

A. Overhead Structural Steel and Related Piping, Ductwork, Electrical Conduit and Metal Deck.
   1. Product: “WATERBORNE ACRYLIC DRY FALL B42T1” manufactured by Sherwin-Williams: www.sherwin-williams.com.
   2. Two (2) coats Eggshell Dry Fall.

2.04 ACCESSORY MATERIALS

A. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. If substrate preparation is the responsibility of another installer, notify Construction Manager of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing coatings that exhibit surface defects.

D. Remove or mask 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. 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. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

H. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

3.03 APPLICATION

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

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Construction Manager’s General Requirements, for general requirements for field inspection.

B. Questionable coated areas will be tested in accordance with SSPC.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 09 96 00

HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings for painting of walls.

B. Special preparation of surfaces.

1.02 REFERENCE STANDARDS

A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes, 2020.

B. ASTM D2486 - Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints, 2017.

C. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact), 2024.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials, 2024.

E. ASTM G53 - Standard Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV - Condensation Type) for Exposure of Non-Metallic Materials, 1996.

F. PDCA P5 - Benchmark Sample Procedures for Paint and Other Decorative Coating Systems, 2004

G. SCAQMD Rule #1168 - Adhesive and Sealant Applications, including most recent amendments.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide complete list of all 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.
   3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
   4. Manufacturer's application instructions.
   5. Submit written proof of approval by the manufacturer and written acknowledgement that equipment to be used is approved by finish system manufacturer.
   6. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.

C. Samples: Submit manufacturer's paper chip samples illustrating range of colors and textures available for each surface finishing product scheduled.

D. Samples: Submit two coating samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on coated card stock, 8 x 10 inch in size.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon of each base coat color used and of each pattern coat color used.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.01 QUALITY ASSURANCE

A. Maintain one copy of each referenced document that applies to application on site.

B. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of decorative finishes of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of five years.
   1. Manufacturer to certify they make all materials in this Section.
   2. All materials within special coatings section including, but not limited to, finishes, and primers shall be supplied by one manufacturer.

C. Applicator Qualifications:

1. Company specializing in performing the work of this section with minimum five years documented experience.
2. Submit manufacturer letter stating that applicator has completed manufacturer's training program.

D. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

E. Mock-Ups (Benchmarks): Prior to application of the work, fabricate and erect mock-ups for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of work.
   1. Prepare a mock-up as per PDCA P5.
   2. Apply minimum 100 square foot of finish system at location on the Project as directed by the Design Professional. Provide separate mock-up for each finish color.
   3. If accepted, mock-up shall demonstrate minimum standard for the work. Mock-up may remain as part of the work.

F. Pre-Application Conference: Conduct pre-application conference in accordance with Section 01 10 00 - General Requirements prior to commencing the application, meet at the Project site to review the material selections, application procedures, and coordination with other trades. Mock-ups shall be reviewed during the pre-application conference. Pre-application conference shall include, but shall not be limited to, the Contractor, the Applicator, and manufacturer's representatives. Date and time of the pre-application conference shall be acceptable to the Owner and the Design Professional.

1.02 MOCK-UP

A. Paint an existing wall as a mock-up sized 4 feet long by 4 feet high; include all layers of coating showing final texture and selected colors.

B. Locate where directed.

C. If accepted mock-up may remain as part of the Work.

1.03 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. Coating Materials: Store at minimum ambient temperature of 50 degrees F and a maximum of 80 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.04 FIELD CONDITIONS

A. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

B. Apply coating under following conditions:
   1. Temperature of air and substrate is between 50 degrees F and 80 degrees F. Relative humidity shall be less than 50 percent.
   2. Prevent wide temperature fluctuations that could cause moisture condensation on freshly coated surfaces.
   3. Application areas shall be free of excessive dust.

C. Maintain minimum 80 footcandles on surfaces to be coated.

D. Provide adequate fresh air and ventilation during application.

E. Restrict traffic from area where coating is being applied or is curing.

1.05 WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for bond to substrate and degradation of chemical resistance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Locker Rooms:
   1. Basis-of-Design: Products specified are those as manufactured by ICP Building Solutions Group www.scuffmaster.com. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by listed manufacturers are acceptable. The Design Professional will be the sole judge of the basis of what is equivalent.

B. Shower Walls & Ceilings - Polyamine Epoxy:
   1. Sherwin Williams.
   2. Tnemec Company, Inc.
   3. PPG Paints.

C. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 HIGH-PERFORMANCE COATINGS

A. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
   1. VOC: Coatings shall have 50 to 100 g/l of VOC's.
   2. Fire Rating: Coatings shall be Type I or Class A fire-rated, ASTM E84.
   3. Scrub Test: Greater than 12000 cycles, ASTM D2486.
   4. Impact Resistance: Greater than 60 in/lbs,, ASTM D2794.
   5. Chemical Resistance: 10 (test maximum) for all chemicals tested, ASTM D1308.
   6. QUV Accelerated Weathering: Greater than 95 percent gloss retention after 500 hours, ASTM G53.
   7. Finish: 10 percent to 15 percent gloss at 60 degrees for non-textured finish systems.
   8. Stain Removal: 8 to 10 (test maximum) for all stains tested, four-hour Open Spot Test.

2.03 MATERIALS

A. Locker Rooms:
   1. Primer:
      a. Provide primer recommended by manufacturer for substrate. All surfaces must be primed prior to applying a "SCUFFMASTER" finish by ICP Building Solutions Group.
      b. Ceramic Tile and Glazed Block Primer: "Primemaster Bonding Primer".
   2. Finish System Components:
      a. General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
      b. Finish Coat: Two-component polyurethane-fortified coating and cross-linker.
         1) Basis of Design: "Scuffmaster ScrubTough Max," ICP Building Solutions Group.
      c. Miscellaneous Materials: Surface patching compounds and other materials necessary for application of finish system shall be of high quality and compatible with coating system.
      d. Colors: Custom colors to be selected by Design Professional.
         1) The project will include a minimum of two (2) separate colors.
   3. Textured Finish System Components:
      a. Base Coat: Water-based polyurethane/acrylic base coat and cross-linker.
         1) Basis of Design: "Ambient Design MC100," ICP Building Solutions Group.
      b. Pattern Coat: Water-based polyurethane/acrylic pattern coat and cross-link. May include up to 3 colors.
         1) Basis of Design: "Ambient Design PC200," ICP Building Solutions Group.
      c. Miscellaneous Materials: Surface patching compounds and other materials necessary for application of finish system shall be of high quality and compatible with coating system.
   4. Schedule:
      a. General: Scheduled number of coats is in addition to surface preparation specified.
      b. Masonry Walls – Accent Color:
         1) Primer: "Primemaster Bonding Primer".

2) Coating: “Scuffmaster ScrubTough Max” polyurethane-fortified eggshell coating with cross-linker, ICP Building Solutions Group.
3) Colors: To be selected by Design Professional.

c. Masonry Walls – Field Color:
1) Primer: “Primemaster Bonding Primer”.
2) Base Coat: “Scuffmaster MC100” ICP Building Solutions Group.
3) Pattern Coat: “Scuffmaster PC200,” ICP Building Solutions Group.
4) Colors: To be selected by Design Professional.

B. Shower Walls & Ceilings - Polyamine Epoxy:
1. Filler Coat:
a. Sherwin Williams “Cement-Plex 875”.
b. Tnemec Company, Inc. “Envirofill Series 130”.
c. PPG Paints “95-217 Cementitious Block Filler”.
1) Cementitious filler coat shall be back rolled and squeegeed. Prior to application of second and third coats, verify that all CMU surfaces are PINHOLE FREE.
2. Second and Third Coats: Gloss, polyamine epoxy glaze-like coating.
a. Sherwin Williams “General Polymers 3746”.
b. Tnemec Company, Inc. “Series 280 Tneme-Glaze”.
c. PPG Paints “Amerlock 2”.
3. Spreading Rate: Block Filler: 40 - 50 sq. ft. per gallon, maximum.

2.04 EQUIPMENT

A. Spray or roll primers and base coats in accordance with manufacturer’s instructions.

B. Spray pattern coats using manufacturer’s proprietary spray equipment only. Contact local manufacturer representative or contact the manufacturer before bidding this work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions under which the work is to be applied, and notify the Contractor in writing, with a copy to the Owner and the Design Professional, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

C. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Applicator.

3.02 PREPARATION

A. Protection: Mask adjacent surfaces to protect from overspray. Protect floors and other surfaces with drop cloths. Repair damage.
1. Remove items which are not to be coated from surfaces that are to be coated. Tag and protect removed items and store until re-installation. Re-install items after completion of coating application. Items which are not to be coated include, but shall not be limited to, operating hardware, electrical device plates, and factory-finished items.
2. Patch and repair substrates as specified in applicable specifications sections. Clean substrates. Remove dirt, grit, loose materials, grease, oil, temporary protective coatings, contamination, other foreign materials, etc. Sand with 100 grit or finer sand paper, spackle, putty, and caulk existing surfaces to produce smooth an uniform substrates. Spot-prime existing water-soluble stains with alcohol or oil-based stain killing primer. Touch-up painted or primed surfaces with compatible paint or specified primer.

B. Ferrous Metals: Remove rust and mill scale. Wire brush or sand damaged or rusted areas to bright metal. Remove grease and other foreign materials with acetone or suitable cleaner. Touch-up damaged areas of shop primer.

C. Wood: Sand smooth and free of marks.

D. Previously Painted Surfaces: De-gloss (if necessary) and re-prime previously painted substrates with manufacturer's recommended primer.

E. Existing Glazed Block: Scarify existing glazed surface using mechanical sanding with a masonry abrasive pad, or light acid/media blasting creating a porous surface as required by manufactures recommendations.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's written instructions and using manufacturer-approved equipment.

B. Apply as many primer coats as necessary to produce a uniform substrate appearance. Do not exceed manufacturer's recommended coverage rate. Allow to dry prior to application of subsequent coats.

C. Re-prime suction and hot spots on substrate prior to applying base coatings.

D. Over wood and gypsum board, sand primer with 100 grit or finer sand paper. Thoroughly remove dust from sanding with a clean, wet rag.

3.04 COATING APPLICATION

A. Finish System:
   1. Apply coatings in accordance with manufacturer's instructions, to thicknesses specified.
   2. Spray or roll finish to completely cover primer and according to manufacturer's written instructions. Apply in a continuous, even film at manufacturer's specified coverage rate.

B. Textured Finish System:
   1. Apply textured finish system in two steps.
   2. Spray or roll base coats to completely cover primer and according to manufacturer's written instructions. Apply in a continuous even film at manufacturer's specified coverage rate.
   3. Spray pattern coat using manufacturer's proprietary spray equipment (may include up to 3 colors). Adjust spray tip size and air pressure for specified finish according to manufacturer's written instructions. Apply pattern coat uniformly to match approved finish standard and at manufacturer-specified coverage rates. Slight variations in particle size, shape, and density shall be normal for textured coatings.

C. Apply each coat to a natural break point such as an edge or corner without stopping.

D. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

E. Finishes shall match approved benchmark samples. Transitions between colors and/or other materials shall be sharp, clean and without overlaps.

3.05 INSPECTION

A. Touch-up and repair unacceptable work.

B. Protect finished areas from damage.

3.06 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material. Remove masking.

C. Repair damage to coatings and surfaces caused by clean-up activities.

D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.07 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to the Applicator, that shall ensure that the high performance coatings shall be without damage at time of Substantial Completion.

END OF SECTION

SECTION 10 11 01

VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Porcelain enamel steel markerboards.

B. Tackboards.

1.02 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2022.

B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

D. ASTM F793/F793M - Standard Classification of Wall Covering by Use Characteristics; 2025.

1.03 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's data on porcelain enamel steel markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

D. Samples: Color charts for selection of color and texture of porcelain enamel steel markerboard, tackboard, tackboard surface covering, and trim.

E. Test Reports: Show compliance to specified surface burning characteristics requirements.

F. Manufacturer's printed installation instructions.

G. Maintenance Data: Include data on regular cleaning and stain removal.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 WARRANTY

A. See Construction Managers General Requirements for additional warranty requirements.

B. Provide fifty (50) year warranty for markerboard surface to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

A. Porcelain Enamel Steel Markerboards:
   1. Manufacturers:
      a. ASI Visual Display Products, LLC: www.americanvisualdisplay.com.
      b. Claridge Products and Equipment, Inc: www.claridgeproducts.com.
      c. Platinum Visual Systems: www.pvsusa.com.
      d. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.
   2. Color: As selected from manufacturer's full range.
   3. Metal Face Sheet Thickness: 24 gauge, 0.0239 inch.
   4. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
   5. Backing: Aluminum foil, laminated to core.
   6. Size: 12 feet.
   7. Frame: Extruded aluminum, with concealed fasteners.
   8. Frame Finish: Anodized, natural.
   9. Accessories: Provide paper hanging strip system, marker tray, map rail, and flag holder.

B. Tackboards: Fine-grained, homogeneous natural cork.
   1. Manufacturers:

a. ASI Visual Display Products, LLC: www.americanvisualdisplay.com.
b. Platinum Visual Systems: www.pvsusa.com.
c. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2. Cork Thickness: 1/4 inch.
3. Fabric: Vinyl-coated fabric.
4. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
6. Size: As indicated on drawings.
7. Frame: Extruded aluminum, with concealed fasteners.
8. Frame Profile: Manufacturer's standard
9. Frame Finish: Anodized, natural.
10. Accessories: Provide paper hanging strip system and map rail.

C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
3. Configuration: As indicated on drawings.
4. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.

2.02 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424, Type I, Commercial Steel, with fired-on vitreous finish.

B. Vinyl Coated Fabric: ASTM F793 Category VI.

C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.

D. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

E. Adhesives: Type used by manufacturer.

2.03 ACCESSORIES

A. Paper Hanging Strip System: Extruded aluminum housing strip with internal roller system; pre-drilled mounting holes and double sided tape; stain finish; lengths as noted on Drawings; equivalent to "GRIP-A-STRIP" manufactured by Advantus Corporation.

B. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.

C. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.

D. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

E. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.

F. Marker Tray: Aluminum, manufacturer's standard profile one piece full length of markerboard, molded ends; concealed fasteners, same finish as frame.

G. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

C. Verify flat wall surface for frameless adhesive-applied boards.

3.02 PREPARATION

A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

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

B. Install with top of marker tray at 36 inches above finished floor.

C. Coordinate locations with Smartboard installation by Others.

D. Secure units level and plumb.

E. Butt Joints: Install with tight hairline joints.

3.04 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at date of Substantial Completion.

END OF SECTION

SECTION 10 14 00

INTERIOR SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

1.02 RELATED SECTIONS

A. Section 10 14 02 - Exterior Signage and Identifying Graphics.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017

1.04 SUBMITTALS

A. See Construction Manager's General 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. Shop Drawings:

1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
    a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
    b. When content of signs is indicated to be determined later, request such information from Owner through Design Professional at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
    c. Submit for approval by Owner through Design Professional prior to fabrication.
3. Samples: Submit one sample of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
4. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Supplier: Obtain all interior signage from a single supplier.

C. Installer Qualifications: Installation shall be performed by an installer specialized and experienced in work similar to that required for this project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store products protected from weather, temperature and other harmful conditions as recommended by supplier. Store tape adhesive at normal room temperature.

C. Package room and door signs in sequential order of installation, labeled by floor or building.

D. Handle products in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

1.08 WARRANTY

A. Manufacturer's Warranty: Submit manufacturer's standard warranty document for a two (2) year warranty from date of substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Panel Signs:
   1. ASI Signage Innovations: www.asimodulex.com.
   2. Best Sign Systems, Inc: www.bestsigns.com.
   3. InPro Corporation: www.inprocorp.com.
   4. Mohawk Sign Systems, Inc: www.mohawksign.com.
   5. Seton Identification Products: www.seton.com/aec.
   6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: 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 restrictive requirements.

2.03 PANEL SIGNAGE

A. Panel Signage:
   1. Application: Room and door signs.
   2. Description: Flat signs with engraved panel media, tactile characters.
   3. Sign Size: Size: 8 x 8 inches square.
   4. Total Thickness: 1/8 inch.
   5. Sign Edges: Squared.
   6. Letter Edges: Squared.
   7. Corners: Radiused.
   8. Color and Font: Unless otherwise indicated:
      a. Character Height: 1 inch.
      b. Character Font: Helvetica, Arial, or other sans serif font.
      c. Character Case: Upper and lower case (title case).
      d. Background Color: As selected by Design Professional form manufacturer's standard colors.
      e. Character Color: Contrasting color as selected by Design Professional form manufacturer's standard colors.
   9. Material: Laminated colored plastic engraved through face to expose core as background color.
   10. Profile: Flat panel without frame.
   11. Tactile Letters: Raised 1/32 inch minimum.
   12. Braille: Grade II, ADA-compliant.
   13. One-Sided Wall Mounting: Tape adhesive.

2.04 SIGNAGE APPLICATIONS

A. Room and Door Signs:
   1. Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   2. Rooms: Identify with room names and numbers to be determined later, not those shown on the drawings.
   3. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN" or BOY'S and GIRL'S, room numbers to be determined later, and braille.
   4. Wall Mounting of One-Sided Signs:
      a. Silastic adhesive.
      b. At masonry walls provide shim plate, mechanically fastened to wall.

2.05 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Adhesive: Silastic Adhesive Mounting (SAM).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs where indicated on Drawings:
   1. Room and Door Signs:
      a. Install at height required per Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities.
   2. If no location is indicated obtain Design Professional’s instructions.

D. Install signs with the following tolerances and in accordance with the manufacturer’s recommendations:
   1. Interior Signs: Within 1/4 inch vertically and horizontally on intended location.

E. Protect from damage until Date of Substantial Completion; repair or replace damage items.

3.03 CLEANING, PROTECTION AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible as observed by the Design Professional.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer’s instructions.

3.04 SCHEDULE

A. Room and Door Signs:
   1. Toilet Rooms: Provide one (1) sign at each toilet room.
   2. Other Rooms: Where indicated on Drawings.

END OF SECTION

SECTION 10 14 02

EXTERIOR SIGNAGE AND IDENTIFYING GRAPHICS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building identification signs.

1.02 RELATED SECTIONS

A. Section 07 42 13 - Metal Wall Panels.

B. Section 10 14 00 - Room Signage.

1.03 REFERENCES

A. ASTM B221/B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

1.04 SYSTEM DESCRIPTION

A. Individual cut aluminum letters; concealed fasteners; factory-finished; stand-off mounting.

B. The sign system shall be reviewed by the Design Professional and will require approval prior to commencing with design and fabrication.

1.05 SUBMITTALS

A. Submit in accordance with Construction Manager's General Requirements.

B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.

C. Shop Drawings: Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

D. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.

PART 2 PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturers:
   1. Inpro Corporation: www.inprocorp.com.
   2. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Aluminum Sheet: ASTM B209.

C. Extruded Aluminum: ASTM B221; 6063-T3 alloy.

D. Fasteners: Type and size to suit application; concealed fastening.

2.02 FABRICATION – INDIVIDUAL LETTERS

A. Material: Cut aluminum, 1/4 inch thick.

B. Copy, Graphics and Size: Refer to Drawings, typestyle to match sign at Bullock Creek Middle School entry canopy.

C. Finish: Fluoropolymer two coat system; CUSTOM colors as selected by Design Professional.

D. Mounting: Mounting shall be threaded stud bosses and a mounting template designating stud locations is not required for mounting on building surface

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer’s instructions.

B. Verify areas are ready to receive signage.

C. Verify location of cast in anchors installed under other sections.

3.02 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.03 COORDINATION

A. Verify location with Design Professional before installing.

B. Coordinate installation with adjacent finish materials in a manner not to destroy adjacent surfaces.

3.04 INSTALLATION

A. Install signs in accordance with manufacturer's instructions. Ensure the installation is proper so as to avoid warps, buckles, distortions, opening up of joints or overstressing of welds and fasteners.

B. Locate and install signs in locations indicated on drawings in accordance with approved shop drawings.

3.05 ADJUSTING

A. Adjusting: Make all final adjustments to components to ensure proper alignment, fit and smooth operation.

3.06 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Upon completion of installation, clean all exposed surfaces in accordance with the manufacturer instructions.

3.07 PROTECTION

A. Protection: Protect installed product from damage during construction.

END OF SECTION

SECTION 10 21 13.19

PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal screens.

1.02 RELATED REQUIREMENTS

A. Section 09 30 00 - Tiling.

B. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, and door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 2 inch x 2 inch in size illustrating panel finish, color, and sheen.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with minimum 5 years experience in the manufacture of the product types specified. If requested submit a list of successful installations of similar products for evaluation by Architect.

B. Accessibility Requirements: Comply with requirements of ICC/ANSI 117.1, and with requirements of authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation.

B. Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation.

C. Lay cartons flat, with adequate support to ensure flatness and to prevent damage to pre-finished surfaces.

1.07 WARRANTY

A. Manufacturer's Warranty: Submit written warranty against defects resulting in breakage, corrosion or delamination for fifteen (15) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. ASI Accurate Partitions, Inc; Product: www.asi-accuratepartitions.com.
   2. ASI Global Partitions; Product: www.asi-globalpartitions.com.
   3. General Partitions Mfg; Product: www.generalpartitions.com.
   4. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 SOLID PLASTIC TOILET COMPARTMENTS

A. Solid PlasticToilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE).
   1. Toilet Partitions: Floor-mounted; overhead braced.
   2. Urinal Screens: Post mounted; floor-anchored; anchored to structure above ceiling.
   3. Color: To be selected from manufacturer’s full range of colors.

B. Doors:
   1. Thickness: 1 inch.
   2. Width: 24 inch.
   3. Width for Handicapped Use: 36 inch, out-swinging.
   4. Height: 55 inch.

C. Panels:
   1. Thickness: 1 inch.
   2. Height: 55 inch.
   3. Depth: As indicated on drawings.

D. Pilasters:
   1. Thickness: 1 inch.
   2. Width: As required to fit space; minimum 3 inches.

E. Screens: Without doors; to match compartments; mounted to wall with two continuous panel brackets and to be overhead braced.

2.03 ACCESSORIES

A. Pilaster Shoes: Formed chromed steel with polished finish, 3 in high, concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails: Hollow anodized aluminum, 1 x 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.

C. Pilaster Brackets: Polished stainless steel.

D. Wall Brackets: Continuous type, polished stainless steel.

E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.

F. Hardware: Polished stainless steel:
   1. Continuous-type hinge, self-closing.
   2. Door Latch: Slide type with exterior emergency access feature.
   3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
   4. Coat hook with rubber bumper; one per compartment, mounted on door.
   5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms.

B. Electric hand dryers; cool dry.

C. Grab bars.

D. Salvaged mirrors, soap dispensers and toilet paper dispensers to be re-installed.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Concealed blocking for mounting of equipment.

B. Section 10 21 13.19 - Plastic Toilet Compartments.

C. Division 26 - Electrical: Power connections.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

E. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.

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 A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

H. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2022.

I. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).

J. ASTM C1036 - Standard Specification for Flat Glass; 2021.

K. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

L. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.

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

N. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

O. ICC A117.1 – Accessible and Usable Buildings and Facilities; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products listed are made by American Specialties, Inc: www.americanspecialties.com.

B. Other Acceptable Manufacturers:

1. Bradley Corporation: www.bradleycorp.com.
2. Bobrick Washroom Equipment, Inc: www.bobrick.com.

2.02 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 (2) keys for each accessory to Owner; master key all lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269, Type 304 or 316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

G. Adhesive: Two component epoxy type, waterproof.

H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

D. Galvanizing for Items Other than Sheet: Comply with ASTM A123; galvanize ferrous metal and fastening devices.

E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

F. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

A. Toilet Paper Dispenser: Double roll, surface mounted, new and existing to be re-installed.

B. Electric Hand Dryers: Traditional fan-in-case type, with downward nozzle.
   1. Operation: Touch-free, Automatic, sensor-operated on and off.
   2. Style: Traditional horizontal, rectangular case.
   3. Mounting: Surface mounted.
   4. Cover: Sheet steel with glossy enamel finish.
      a. Color: White.
      b. Tamper-resistant screw attachment of cover to mounting plate.
      c. Screened or shielded air intake.
      d. Screen or shield to prevent access to motor/heater.
   5. Heater: Owner adjustable on/off heater setting for cool air drying.
   6. Fan/Heater Control: Field adjustable.
   7. Runtime: Field adjustable.
   8. Supply Voltage: 115- 120V AC.
   9. Warranty: Three (3) years.
   10. Basis-Of-Design: “TURBO ADA HIGH SPEED” manufactured by American Specialties,Inc: www.americanspecialties.com.

C. Soap Dispenser: Liquid soap dispenser, vertical, surface-mounted, new and existing to be re-installed.

D. Mirrors: Stainless steel framed, 6 mm thick float glass mirror, new and existing to be re-installed.
   1. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
   2. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.

E. Grab Bars: Stainless steel, nonslip grasping surface finish.

1. Heavy Duty Grab Bars: Floor supports are acceptable if necessary to achieve load rating.
    a. Push/Pull Point Load: Minimum 1000 pound-force, minimum.
    b. Dimensions: 1-1/2 inch outside diameter, minimum 0.125 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
    c. Length and Configuration: As indicated on drawings.
2. Fabricated to comply with ASTM F446 and to withstand a 900 pound force, from ASTM A554 stainless steel tubing, Type 304, 18-8 alloy; each end heliarc-welded to minimum 11 gage stainless steel circular flange; welds finished to match tube finish.

F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable wax paper collection bag.

G. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Style: Horizontal.
2. Material: Polyethylene.
3. Mounting: Surface.
4. Color: Gray and white speckled.
5. Minimum Rated Load: 250 lbs.

H. Wall-Mounted Soap Dish: With concealed mechanical fastening suitable for substrate.
1. Mounting: Surface-mounted.
2. Material and Finish: Chrome Plated.

I. Shower Curtain Rod: Stainless steel tube, 1 inch OD, 0.04 inch wall thickness, satin-finished, with 3 inch OD, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.

J. Shower Curtain:
1. Material: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain resistant.
2. Size: Width varies by 72 inches, hemmed edges.
3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
4. Color: White.
5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.

K. Folding Shower Seat: Wall-mounted; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped, right hand and left hand seats.
1. Seat: Phenolic or polymeric composite seat slats, white color.
2. Size: ADA Standards compliant.

2.05 UTILITY ROOM ACCESSORIES

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
1. Holders: 3 spring-loaded rubber cam holders.
2. Length: Manufacturer’s standard length for number of holders.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

3.05 SCHEDULE

A. Items listed below are identified by American Specialties catalog numbers (except where noted) to set quality standards. Equivalent products by specified acceptable manufacturers may be considered.

TAS-1

High School

Men's Toilet A138 & B112

3	Mirror	Re-install existing salvaged unit
2	Soap Dispenser	Re-install existing salvaged unit
2	Toilet Paper Dispenser	Re-install existing salvaged unit
2	Hand Dryer	0199-1
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches

TAS-2

High School

Women's Toilet A137 & B111

3	Mirror	Re-install existing salvaged unit
2	Soap Dispenser	Re-install existing salvaged unit
4	Toilet Paper Dispenser	Re-install existing salvaged unit
2	Hand Dryer	0199-1
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches
4	Sanitary Napkin Disposal	0852

TAS-3

High School

Men's Toilet D101

5	Mirror	Re-install existing salvaged unit
3	Soap Dispenser	Re-install existing salvaged unit
4	Toilet Paper Dispenser	Re-install existing salvaged unit
3	Hand Dryer	0199-1
1	Grab Bar	36 inches
3	Grab Bar	42 inches
3	Grab Bar	18 inches

TAS-4

High School

Women's Toilet E111

5	Mirror	Re-install existing salvaged unit
3	Soap Dispenser	Re-install existing salvaged unit
9	Toilet Paper Dispenser	Re-install existing salvaged unit
4	Hand Dryer	0199-1
1	Grab Bar	36 inches
3	Grab Bar	42 inches
3	Grab Bar	18 inches
9	Sanitary Napkin Disposal	0852

TAS-5

High School (Add Alternate)

Men's Toilet F115 & Women's Toilet F114

1	Mirror	0600 Series (24 inches x 36 inches)
1	Soap Dispenser	Existing to remain in current location
2	Toilet Paper Dispenser	Existing to remain in current location
1	Hand Dryer	0199-1

TAS-6

High School

Corridor Outside Toilet Rooms F114 & F115

1	Paper Towel Dispenser	Re-install existing salvaged unit

TAS-7

Middle School

Family Toilet 219

1	Mirror	0600 Series (24 inches x 36 inches)
1	Soap Dispenser	0347
1	Toilet Paper Dispenser	0039
1	Hand Dryer	0199-1
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches
1	Grab Bar	3456
1	Grab Bar	24 inches
1	Sanitary Napkin Disposal	0852
1	Diaper Changing Station	9014
1	Clothes Hook	7382-S
1	Towel Pin	7301-S
1	PH Shower Seat	8203
1	Soap Dish	0720-Z
1	Shower Rod	1204-2 36 inches
1	Shower Curtain	1200-V42
7	Shower Curtain Hooks	1200-ROL

TAS-8

Middle School

Girls Shower 223.1 & Boys Shower 224.1

2	Grab Bar	3456
2	Grab Bar	24 inches
4	Clothes Hook	7382-S
4	Towel Pin	7301-S
2	PH Shower Seat	8203
4	Soap Dish	0720-Z
2	Shower Rod	1204-2 56 inches
2	Shower Curtain	1200-72
24	Shower Curtain Hooks	1200-ROL
2	Shower Rod	1204-2 42 inches
2	Shower Curtain	1200-48
16	Shower Curtain Hooks	1200-ROL
4	Shower Rod	1204-2 36 inches
4	Shower Curtain	1200-42
28	Shower Curtain Hooks	1200-ROL

TAS-9

Middle School

Girl's Toilet 223.2

2	Mirror	0600 Series (24 inches x 36 inches)
2	Soap Dispenser	Re-install existing salvaged unit
2	Toilet Paper Dispenser	Re-install existing salvaged unit
2	Hand Dryer	0199-1
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches
2	Sanitary Napkin Disposal	0852

TAS-10

Middle School

Boy's Toilet 224.2

2	Mirror	0600 Series (24 inches x 36 inches)
2	Soap Dispenser	Re-install existing salvaged unit
1	Toilet Paper Dispenser	Re-install existing salvaged unit
2	Hand Dryer	0199-1
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches

TAS-11

Middle School

Men's Toilet 220

2	Mirror	Re-install existing salvaged unit
2	Soap Dispenser	Existing to remain
1	Toilet Paper Dispenser	Re-install existing salvaged unit
1	Grab Bar	36 inches
1	Grab Bar	42 inches
1	Grab Bar	18 inches

TAS-12
Floyd Elementary School
Staff Lounge

1	Paper Towel Dispenser	8522

TAS-13
Floyd Elementary School
Mechanical A141

1	Mop Rack	8215-3

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

1.02 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, and locations.

C. Product Data: Provide extinguisher operational features, color and finish, anchorage details, and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers:
   1. Larsen's Manufacturing Co; MP-10: www.larsensmfg.com.
   2. Ansul, Inc: www.ansul.com.
   3. Pyro-Chem: www.pyrochem.com.
   4. Strike First Corporation of America: www.strikefirstusa.com.
   5. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Fire Extinguisher Cabinets:
   1. Larsen's Manufacturing Co; AL2409-6R: www.larsensmfg.com.
   2. Ansul, Inc: www.ansul.com.
   3. JL Industries, Inc: www.jlindustries.com.
   4. Potter-Roemer: www.potterroemer.com.
   5. Pyro-Chem: www.pyrochem.com.
   6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL for the purpose specified and indicated.

B. Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
   1. Cartridge Operated: Spun shell.
   2. Stored Pressure Operated: Deep Drawn.
   3. Class: A:B:C.
   4. Size: 10 pound.
   5. Size and classification as scheduled.
   6. Finish: Baked polyester powder coat.
   7. Temperature range: -65 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS

A. Aluminum cabinet with aluminum front & steel tub.

B. Metal: Formed aluminum; .063 inch thick

C. Cabinet Configuration: Semi-recessed type.
   1. Sized to accommodate accessories.

2. Exterior nominal dimensions of 13 inch wide x 27 1/2 inch high.
3. Trim: Returned to wall surface, with 2 1/2 inch projection, 2 1/2 inch wide face.
4. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
5. ADA compliant cabinet.

D. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with two butt hinge. Provide nylon catch.

E. Door Glazing: Full panel, clear acrylic, 1/8 inch thick. Set in resilient channel gasket glazing.

F. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

G. Weld, fill, and grind components smooth.

H. Finish of Cabinet Exterior Trim and Door: Aluminum.

I. Finish of Cabinet Interior: White enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 32 inches from finished floor to inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

3.03 SCHEDULES

A. Install total of One (1) cabinet in the following locations:
1. Pine River Elementary - Vestibule 150.

END OF SECTION

SECTION 10 51 02

LOCKER REFURBISHING

PART 1 GENERAL

1.01 SUMMARY

A. The Work required under this Section consists of refurbishing existing lockers and related items necessary to complete the Work as specified herein.
   1. Bidders for this work shall be responsible for visiting the site and perfoming a thorough analysis of the locker units, inventorying all required repairs and required replacement parts. No extra costs shall be assessed to the Owner for the Bidder's failure to thoroughly inspect and examine the site prior to submitting the proposal.

1.02 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Submit shop drawings indicating types of all related accessory items being installed and added to the existing refurbished lockers. Shop drawings shall indicate type of material, gauges of metal, reinforcement, filler, finishing strips, and other details of construction. They shall show methods and details of attachment, layout of the lockers, and devices to be furnished by others.

C. Product Data: Submit manufacturer's data for paint and texturing additive.

D. When a numbering system is indicated, shop drawings shall identify the locations where each series is to be installed.

E. Submit for Design Professional's selection samples of paint manufacturer's full color line, including standard and optional colors (minimum of 15 colors).

F. Colors as selected by Design Professional. A maximum of three (3) different custom colors may be used.

1.03 QUALITY ASSURANCE

A. Contractor applying electrostatic paint shall have five years of experience in this type of application.

B. Contractor refurbishing existing lockers shall have five years of experience in this type of Work.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Inspect for dents, scratches, or other damage. Replace damaged units.

B. Store in manufacturer's unopened packaging until ready for installation.

C. Store under cover and elevated above grade.

1.05 WARRANTY

A. Submit written one (1) year warranty to protect the Owner against defects, peeling, flaking and chipping that are the result of poor workmanship and not caused by normal usage.

PART 2 PRODUCTS

2.01 SUMMARY

A. locker refurbishing includes the following types of Work to the existing lockers where indicated on the Drawings and details:
   1. Prepare lockers to receive new electrostatic paint system.
   2. Paint existing lockers with electrostatic paint system.

2.02 MATERIALS

A. Finish: Completed locker unit shall be thoroughly sanded cleaned for paint adhesion and fine quality finish. Finish coat shall be electrostatically applied paint system consisting of three coats of a two-component polyamide. Color shall be custom colors as selected by the Design Professional, with 55 to 65 sheen. Design Professional can choose a maximum of three (3) different colors.

B. Provide all items and accessories as required to completely refinish and refurbish existing lockers as indicated on the Drawings.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove all parts and accessories that are not painted such as number plates, hooks, handles, locks, etc.and store for re-installation.

B. Remove all foreign substances, tapes, resin, ink and deleterious items from all locker surfaces.

C. Wet sand all locker surfaces using 80 grit sandpaper.
   1. Machine feather sand areas as required.

D. Throughly wash all locker surfaces with a cleaning and degreasing solution.

3.02 ELECTROSTATIC PAINTING

A. Mask all adjacent walls, floors and ceilings to protect from overspray.

B. Install plastic sheeting on floors and afix with tape to protect all floor areas from spillage and overspray.

C. Electrostatically apply three (3) coats of two-component polyamide, floor grade epoxy paint.

D. After painting, remove all masking and plastic sheeting.

E. Perform thorough cleaning of the areas adjacent to the Work.

3.03 REPAIRS AND REPLACEMENTS

A. Clean and re-install all non-painted items.

3.04 INSTALLATION

A. Lockers shall be protected against scratches and damage until Date of Substantial Completion.

END OF SECTION

SECTION 10 51 13

METAL LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lockers.

B. Metal tops and filler panels.

C. ADA benches.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete base construction.

B. Section 06 10 00 - Rough Carpentry: Wood base construction.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

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

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 SUBMITTALS

A. See Construction Manager’s General 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, combination lock code, and accessory locations.

D. Samples: Submit two samples 3 x 3 inches in size, of each color scheduled.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lockers:
   1. Art Metal Products: www.artmetalproducts.com.
   2. Lyon, LLC: www.lyonworkspace.com.
   3. Penco Products, Inc: www.pencoproducts.com.
   4. Republic Storage Systems Co: www.republicstorage.com.

2.02 LOCKER APPLICATIONS

A. Corridor Lockers: Double tier metal lockers, wall mounted on wood framed base.
   1. Width: 15 inches.
   2. Depth: 12 inches.
   3. Height: 30 inches per locker for a total of 60 inches.
   4. Fittings: Hat shelf, 3 single coat hooks on wall panels and 1 double prong hook at bottom of hat shelf in each locker.
   5. Ventilation: Louvers at top and bottom of door panel.
   6. Locking: Able to accept a padlock provided by others.
   7. Provide p.h. lockers as required.

B. Athletic Lockers: Single tier metal lockers, wall mounted and free standing on concrete base.
   1. Width: 12 inches.
   2. Depth: 12 inches.
   3. Height: 60 inches.
   4. Fittings: Hat shelf, 3 single coat hooks on wall panels and 1 double prong hook at bottom of hat shelf in each locker.
   5. Ventilation: Perforated doors.

6. Locking: Built-in combination locks.
7. Provide sloped top.
8. Provide p.h. lockers as required.

2.03 METAL CORRIDOR LOCKERS

A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
   1. Where ends or sides are exposed, provide flush panel closures.
   2. Provide filler strips where indicated, securely attached to lockers.
   3. Color: To be selected by Design Professional; allow for multiple colors of lockers to be used throughout project.

B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
   1. Body and Shelves: 24 gage, 0.024 inch.

C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
   1. Door Frame: 16 gage, 0.060 inch, minimum.

D. Doors: Formed from one piece 14 gauge cold rolled sheet steel. Formations shall consist of a full channel shape on the lock side of adequate depth to fully conceal the lock bar, channel formation on the hinge side and right angle formations across the top and bottom.
   1. Form recess for operating handle and locking device.
   2. Ventilation slots at top and bottom.

E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.
   1. Hinge Thickness: 14 gage, 0.075 inch.

F. Trim: 20 gage, 0.036 inch.

G. Coat Hooks: Stainless steel.

H. Number Plates: Provide oval shaped brass plates. Form numbers not less than 1/2” inch high of block font style with ADA designation, in contrasting color.

I. Latching shall be a one-piece, pre-lubricated spring steel latch, completely contained within the lock bar under tension to provide rattle-free operation. The lock bar shall be of pre-coated, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. There shall be three latching points for lockers over 42" in height and two latching points for all tiered lockers 42" and under in height. The lock bar travel is limited by contacting resilient high-quality elastomeric cushioning devices concealed inside the lock bar. Frame hooks to accept latching shall be of heavy gauge steel, set close in and welded to the door frame. Continuous vertical door strike shall protect frame hooks from door slam damage. A soft rubber silencer shall be securely installed on each frame hook to absorb the impact caused by closing of the door. A Latch Guard steel plate shall be welded on each frame hook on tiered lockers.

J. Locking: Recessed lifting handle designed to accept padlocks supplied by the users.

2.01 METAL ATHLETIC LOCKERS

A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
   1. Where ends or sides are exposed, provide flush panel closures.
   2. Provide filler strips where indicated, securely attached to lockers.
   3. Color: To be selected by Design Professional; allow for contrasting colors for locker bodies and doors.

B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
   1. Body and Shelves: 24 gage, 0.024 inch.
   2. Base: 20 gage, 0.036 inch.

C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
   1. Door Frame: 16 gage, 0.060 inch, minimum.

D. Doors: Formed from one piece 14 gauge cold rolled sheet steel. Formations shall consist of a full channel shape on the lock side of adequate depth to fully conceal the lock bar, channel formation on the hinge side and right angle formations across the top and bottom.
   1. Door Face: 14 gauge, 0.075, minimum.
   2. Form recess for operating handle and locking device.
   3. Ventilation consists of diamond shaped perforations 3/4" wide by 1-1/2" high.

E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.
   1. Hinge Thickness: 14 gage, 0.075 inch.

F. Sloped Top: 20 gage, 0.036 inch, with closed ends.

G. Trim: 20 gage, 0.036 inch.

H. Coat Hooks: Stainless steel.

I. Number Plates: Provide oval shaped brass plates. Form numbers not less than 1/2” inch high of block font style with ADA designation, in contrasting color.

J. Latching shall be a one-piece, pre-lubricated spring steel latch, completely contained within the lock bar under tension to provide rattle-free operation. The lock bar shall be of pre-coated, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. There shall be three latching points for lockers over 42" in height and two latching points for all tiered lockers 42" and under in height. The lock bar travel is limited by contacting resilient high-quality elastomeric cushioning devices concealed inside the lock bar. Frame hooks to accept latching shall be of heavy gauge steel, set close in and welded to the door frame. Continuous vertical door strike shall protect frame hooks from door slam damage. A soft rubber silencer shall be securely installed on each frame hook to absorb the impact caused by closing of the door. A Latch Guard steel plate shall be welded on each frame hook on tiered lockers.

K. Combination: 3 digit dial type. Provide 5 preset combinations to be selected by pressing button. Locks shall have random combination change pattern with no sequentially adjacent locks having same pattern.
   1. Provide 5 pin tumbler cylinder for supervisory access.

2.02 ADA LOCKER UNITS

A. Interior Requirements: Single-Tier lockers shall have a hat/book shelf and hooks located no more than 48 inches above the finished floor surface.
   1. One additional shelf shall be located near the locker bottom no lower than 12 inches above finished floor.

B. ADA compliant lock:
   1. Lock Description: Provide 3 digit combination and 5 preset combination changes with 5 pin tumbler lock cylinder which is master keyed to a master key and student key.

C. Basis-of-Design: "No. 1656MKADA" manufactured by Master Lock Company: www.masterlock.com.

D. Signage: A decal with the international symbol of accessibility shall be applied to the face of the door.

2.03 ADA BENCHES

A. Benches: Portable wood benches with seat & back.
   1. Wood: Laminated maple, 1-1/4" full finished thickness. All corners are to be rounded and sanded. Seat, back and edges shall have two coats of a clear finish with one coat on the bottom.
   2. Seat Height: 17-1/2 inches.
   3. Size:
      a. Length: 42 inches.
      b. Depth:
         1) Seat: 20 inches minimum.
         2) Back: 20 inches minimum and located with bottom of back 2 inches above the seat.

4. Pedestals: Two trapezoidal shaped stainless steel pieces. Non-skid pads shall be provided for each pedestal.
5. Back Bracket: Provide 19 inch x 19 inch x 2 inch bracket similar to Penco #6ACXHP61H. Two per bench.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Place and secure on prepared base.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, and sloped tops.

G. Install accessories.

H. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interior and exterior surfaces.

END OF SECTION

SECTION 11 68 33.43

TRACK AND FIELD EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work under this section shall consist of furnishing all labor, materials and equipment for the removal of the existing Discus Cage and Ring and providing and installing of the new equipment according to the drawings and specifications.

1.02 QUALITY ASSURANCE

A. Perform all work in accordance with the Michigan High School Athletic Association (MHSAA).

B. Installer Qualifications: Company specializing in performing work of the type specified with minimum five (5) years of experience.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories.

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.

PART 2 PRODUCTS

2.01 DISCUS RING AND CAGE

A. Discus Cage:
   1. Manufacturers:
      a. Basis-Of-Bid: “MODEL 8010 HIGH SCHOOL ALUMINUM DISCUS CAGE, 6 POLE” by Gill Athletics: www.gillathletics.com.
      b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.
   2. Description:
      a. Ground Sleeves:
         1) Consists of six (6) ground sleeves.
         2) Constructed of 3” Sch40 PVC pipe.
         3) 30” long.
      b. Net Poles:
         1) Consists of six (6) net poles.
         2) Constructed of 2½” Sch40 aluminum pipe.
         3) Net poles will be off-set and stand at least 14’ tall when installed in the ground sleeves.
         4) Net poles will have rope tie-off cleats.
         5) The top of the net poles will be capped.
         6) The net poles will have holes for installing hardware to hang the net from.
      c. Hoisting Rope:
         1) Rope used to hang the net from the net poles will be 1/4” braided polyester.
         2) 25’ long.
      d. Net:
         1) Constructed of 100% white nylon 6 yarn solution dyed black.
         2) 1 7/8”sq mesh (3 ¾” stretch mesh), raschel knotless netting.
         3) UV stabilized and heat-set.
         4) 180lb break strength.
         5) Rope bound.
         6) 14’ x 56’.

e. Net Support Cable:
   1) Constructed of 1/8”-3/16”.
   2) PVC coated, galvanized steel cable.
   3) The top of the net will be supported by the net support cable along the entire length of the net.
f. Flip Arms:
   1) Consists of two (2) flip arms constructed of 3/8” x 2” steel.
   2) 32” long.
   3) Flip arms will be attached to the two front net poles at ground level and to the front bottom corners of the net to keep the net secured.
g. Powder Coat Finish:
   1) Color to be selected from manufacturers standard colors by Design Professional.
h. Ground Stakes:
   1) Constructed of plastic.
   2) 9” long.
   3) Ground stakes will be used to secure the net to the ground at the rear poles and between each pole.
i. Hardware:
   1) All hardware is to be zinc plated.
j. Warning Signs:
   1) Consists of three (3) warning signs constructed of polyethylene board 10” x 14”.
   2) The warning signs will be fastened to the outside of the net, at eye level, facing outward, at the front sides of the discus cage and at the rear of the discus cage.

B. Discus Ring:
1. Manufacturers:
   a. Basis-Of-Bid: “ALUMINUM CIRCLE” by Gill Athletics: www.gillathletics.com.
   b. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.
2. Description:
   a. Four sections of 2 inch by 2 inch extruded aluminum angle.
   b. System to include anchor bolts to allow attachment to concrete pad.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subgrade elevations are correct and that all earthwork and compacted fills are in place.

B. Coordinate the installation of all equipment with the Construction Manager and applicable trades.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer’s instructions.

B. Verify all locations and conform to MHSAA rules and drawing dimensions.

3.03 FIELD QUALITY CONTROL

A. Reference Construction Manager's General Requirements, for testing requirements.

3.04 PROTECTION

A. Immediately after installation, protect equipment from displacement and mechanical injury until the site has been accepted by the Owner.

END OF SECTION

SECTION 12 24 01
ROLLER WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manually operated roller shades with light diffusing fabric.

B. Attachment hardware.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

1.03 REFERENCES

A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023 with Errata.

B. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.

B. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
   2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. See Construction Manager's General 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, mounting dimension requirements for each product and condition, and operation direction.

D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.

E. Selection Samples: Submit 3 x 3 inch swatches illustrating manufacturer’s standard range of colors along with a color chart illustrating available colors for operating parts and hardware.

F. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

G. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum three years of documented experience with shading systems of similar size and type.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 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.

1.08 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. See Construction Manager's General Requirements for additional warranty requirements.

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade Hardware: One year.
   2. Fabric: One year.
   3. Aluminum and Steel Coatings: One year.

C. Contractor's Warranty: One (1) year installation warranty against defects arising from workmanship.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Draper, Inc; www.draperinc.com.

B. Hunter Douglas; www.hunterdouglas.com.

C. Nysan Shading Systems Ltd; www.nysan.com.

D. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 ROLLER SHADES

A. General:
   1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
   2. Provide shade system that operates smoothly when shades are raised or lowered.
   3. Width of Units: Roller shade assembly can be more than one space wide but the ends of each shade must be at a mullion. Contractor must review size and layout with Design Professional.

B. Interior Roller Shades - Basis of Design: Draper, Inc; Clutch Operated FlexShade NEXD: www.draperinc.com.
   1. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
      a. Mounting: Wall-mounted, between jambs.
   2. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
   3. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
      a. Material: Extruded aluminum or steel, with wall thickness and material selected by manufacturer.
      b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
      c. Fabric Length: 6 inches greater than window height minimum.
      d. Orientation: Regular from back of roller.
   4. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
      a. Closed pocket elliptical slat: 1" aluminum elliptical slat inside of a 1 5/8" pocket with heat sealed ends.
   5. Manual Operation:
      a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
      b. Drive Chain: Continuous loop, stainless steel, beaded ball chain, 95 lb minimum breaking strength; comply with WCMA A100.1. Provide upper and lower limit stops.
         1) Stainless steel bead chain.
         2) Chain Retainer: Chain tensioning device complying with WCMA-A00.1.
   6. Accessories:
      a. End Cap Covers: Provide manufacturer's standard end caps to cover ends of brackets.
      b. Fasteners: Noncorrosive, and as recommended by shade manufacturer

2.03 SHADE FABRIC

A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
   1. Material: Vinyl coated fiberglass.
   2. Performance Requirements:
      a. Flammability: Pass NFPA 701 large and small tests.
   3. Openness Factor: 3%.
   4. Roll Width: 96 inches.
   5. Color: As selected by Design Professional from manufacturer’s full range of colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.
   1. Verify all window dimensions prior to beginning fabrication.

B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

3.05 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 20 00 00

BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Requirements specifically applicable to Division 22 and 23.

B. This Contractor shall provide and pay for all labor, materials, equipment, appliances, tools, construction equipment and machinery, transportation, and all services required for the execution, completion and operation of all mechanical systems, whether temporary or permanent and whether or not incorporated in the Work.

1.02 LOCAL CONDITIONS

A. Contractor shall visit the site and become familiar with conditions which will affect work that is to be performed. Submission of a proposal by this Contractor shall be conclusive evidence that this Contractor has visited the site and has given proper consideration and evaluation of these conditions in preparation of his proposal. No allowance shall be made to the Contractor for extra expense incurred due to neglect to properly make this visit and examination.

B. Where active sewers, gas, electric or other services are encountered during performance of this contract, Contractor shall protect, brace and support them as required. Do not prevent, interrupt or disturb operation of existing services that are to remain. Relocate existing services as required.

C. Drawings show approximate locations of existing utilities. Contractor shall verify exact location of services which they may expect to encounter.

1.03 RELATED SECTIONS

A. Section 02 41 00 - Demolition.

B. Section 03 30 00 - Cast-In-Place Concrete.

C. Section 04 20 00 - Unit Masonry.

D. Section 05 50 00 - Metal Fabrications.

E. Section 07 54 00 - Thermoplastic Membrane Roofing.

F. Section 07 84 00 - Firestopping.

G. Section 07 90 05 - Joint Sealers.

H. Section 09 21 16 - Gypsum Board Assemblies.

I. Section 09 90 00 - Painting and Coating.

J. Section 10 28 00 - Toilet, Bath and Laundry Accessories.

K. Division 26 - Electrical Requirements.

1.04 CODES AND STANDARDS

A. All work shall be installed in accordance with applicable local and state regulations, including but not limited to the following:

1. Plumbing work shall be done in accordance with plumbing code of the State of Michigan, local regulations, codes, and ordinances, and any other codes or regulations having legal jurisdiction in the area.
2. Mechanical work shall be done in accordance with applicable Standards and all State, Federal and local codes, regulations or ordinances which may legally apply in the area.
3. In the event Drawings and Specifications conflict with applicable rules, regulations or codes, said rules, regulations and codes shall govern Contractor. Should any change in Drawings and/or Specifications be required to comply with rules, regulations or codes, Contractor shall notify Design Professional, in writing, before entering into contract. After entering into contract, all work shall be completed without addition to contract amount. Any changes in the work to secure certificates shall be made by Contractor at his own expense.
4. Standards of Industry: Reference to industry standards where applicable:
   a. UL - Underwriters' Laboratories, Inc.
   b. AGA - American Gas Association

c. ASA - American Standards Association
d. ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
e. ASME - American Society of Mechanical Engineers
f. ASTM - American Society for Testing and Materials
g. AMCA - Air Moving and Conditioning Association
h. NBFU - National Board of Fire Underwriters
i. NFPA - National Fire Protection Association
j. AWWA - American Water Works Association
k. FIA - Factory Insurance Association
l. FM - Factory Mutual Insurance Companies
m. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association, Inc.
n. Local and State Codes
o. National Plumbing Codes
p. State of Michigan Boiler Act of 1965 and Board of Boiler Rules
q. Michigan Barrier Free Design Graphics Manual
r. PDI - Plumbing Drainage Institute

1.05 PERMITS AND INSPECTIONS

A. Contractor shall file approval forms when required, obtain and pay for all required permits, pay all required deposits, arrange for and pay for all required or necessary inspections.

B. Contractor shall make all arrangements for inspections in keeping with project progress to prevent unnecessary delays. Upon completion of the project, Contractor shall submit all final inspection certificates to Design Professional for Owner's file.

1.06 COORDINATION

A. Coordinate with Construction Manager’s General Requirements.

B. Coordinate fully with all other Contractors and trades to assure efficient and orderly sequence of installation of interdependent systems and system elements.

C. Installation shall be made so that all component parts function together as a workable system, which shall be complete with all accessories necessary for proper operation. When installation is complete, all equipment shall be operative and in proper adjustment. All work shall be executed in conformity with the best practice so as to contribute to efficiency of operation, minimum maintenance, accessibility and aesthetics.

D. Contractor shall consult Drawings, Shop Drawings, manufacturer's literature, and specifications for all trades to determine nature and extent of work specified in other sections which adjoins or attaches to their work.

E. Contractor shall confer with other Contractors and Subcontractors at the site to coordinate the work in view of job conditions so that interferences may be eliminated and maximum head room and clearance may be obtained.

F. In the event that interferences develop, Design Professional's decision will be final as to which trade shall relocate its work and no additional compensation will be allowed for the moving of pipes, ductwork or equipment to clear such interferences.

G. Cutting, patching and painting resulting from this Contractor's improper location or coordination of the work shall be done by Contractor who originally installed same, but this Contractor will be required to bear expenses.

H. Contractor is responsible for providing and installing any access panels or doors which may be required to provide access to valves, controls, fittings, etc. that are installed behind permanent walls, ceilings, bulkheads, soffits or floors.

1.07 CUTTING AND PATCHING

A. Contractor shall do all cutting and patching required for work and coordinate pipe, duct, and equipment locations with other trades.

B. All major patching and repairing of work caused by this Contractor shall be done by Contractor who originally installed same, but this Contractor will be required to bear expenses.

C. No cutting or drilling of structural members shall be done without written permission from the Design Professional.

D. Provide fire stops for all mechanical openings in fire rated surfaces. Seal space between sleeves and pipes with approved fire proofing material. Integrity of system shall be maintained to the rating of the item pierced.

1.08 MINOR DEVIATIONS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. Drawings are not to be scaled nor serve as Shop Drawings.

B. Drawings show design intent and this Contractor shall field check dimensions, actual locations, distances and levels will be governed by actual field conditions and variations in equipment being provided.

C. Contractor shall follow Drawings in laying out work and checking Drawings of other trades to verify spaces in which work will be installed. Where headroom or space conditions are inadequate, Design Professional shall be notified before proceeding with installation.

D. Items not specifically mentioned in Specifications or noted on Drawings, but which are obviously necessary to make a complete working installation shall be included at no extra cost to the Owner.

E. If directed by Design Professional, this Contractor shall, without extra charge, make reasonable modifications in layout as needed to prevent conflicts with work of other trades or for proper execution of work.

1.09 SUBMITTALS

A. Coordinate with Construction Manager’s General Requirements.

B. Design Professional will not be responsible for errors in quantities, dimensions to fit job conditions, details of fabrication to insure proper assembly at job site, or for errors resulting from mistakes in Submittals even though reviewed.

C. Responsibility for these items rests with Contractor and his Suppliers.

D. Any equipment used by the Contractor that is not specifically shown on drawings is considered alternate equipment and all additional installation costs incurred by the use of this equipment shall be at the Contractor’s expense.

1.10 EQUIPMENT

A. Coordinate with Construction Manager’s General Requirements.

B. Only substitutions made by addendum, prior to receipt of bids, will be binding.

C. After Award of Contract substitutions will only be considered when a Product becomes unavailable through no fault of this Contractor.

D. Where equipment manufacturer's names are listed, they are listed not only to indicate an acceptable manufacturer, but further to ensure providing a certain quality, a feature, or other item of design not specifically mentioned in the detailed description.

E. Where Contractor proposes to use an item of equipment other than specified or detailed on the Drawings, which requires any redesign of structure, partitions, foundations, wiring or any other part of mechanical, electrical or architectural layout, all such redesign, and all new Drawings and detailing required therefore, shall be prepared by this Contractor at their own expense.

F. Where such approved deviation requires a different quantity and arrangement of piping, ductwork and equipment from that specified or indicated on Drawings or Shop Drawings, Contractor shall furnish and install any such piping, ductwork, etc., and any other additional equipment required by system at no additional cost to Owner. Contractor shall also be responsible for electrical and other trade work not mentioned above upon such equipment substitution.

1.11 CLEANING AND FINISHING

A. Coordinate with Construction Manager’s General Requirements.

B. All piping, insulation, unfinished iron work, fixtures and equipment shall be cleaned at completion of Work.

C. Two (2) weeks after turning systems over to Owner, all strainers, filters, and automatic controls shall be cleaned and checked.

D. Owner shall be instructed on system operations and maintenance, including lubrication, filter replacement or cleaning, seasonal change over as required, control operation, and such other information as necessary.

1.12 GUARANTEE AND WARRANTY

A. Contractor shall guarantee all of their work and the work of their subcontractors to be free from defects in material and workmanship for a period of Two (2) years from date of final acceptance of the work, unless a longer period is stipulated under specific headings, and shall repair or replace at no additional cost to Owner any material or equipment developing defects and shall also make good any damage caused by such defects or the correction of defects. Repairs or replacements shall be guaranteed for one year, dated from the final acceptance of the repair or replacement. This replacement shall be binding even though it will exceed product guarantees normally furnished by some manufacturers.

B. Contractor shall submit their own and each equipment manufacturer's written certificates, warrantying that each such item of equipment furnished complies with all requirements of the Drawings and Specifications.

C. Note that guarantee shall run from date of final acceptance of the work, **NOT** from date of installation of a device or piece of equipment.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe Markers.

D. Ceiling Grid labels.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coating: Identification painting.

1.03 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2026.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2025.

1.04 SUBMITTALS

A. See Construction Manager's General 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.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

A. Air Handling Units: Nameplates.

B. Control Panels: Nameplates.

C. Dampers: Ceiling tacks, where located above lay-in ceiling.

D. Heat Transfer Equipment: Nameplates.

E. Major Control Components: Nameplates.

F. Piping: Tags.

G. Pumps: Nameplates.

H. Valves: Tags and ceiling grid labels where located above lay-in ceiling.

2.02 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: White.
   2. Letter Height: 1/4 inch.
   3. Background Color: Black.
   4. Plastic: Conform to ASTM D709.

2.03 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.04 PIPE MARKERS

A. Color: Comply with ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Color code as follows:
   1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.
   2. Fire Quenching Fluids: Red with white letters.
   3. Toxic and Corrosive Fluids: Orange with black letters.
   4. Flammable Fluids: Yellow with black letters.
   5. Combustible Fluids: Brown with white letters.
   6. Compressed Air: Blue with white letters.

2.05 CEILING GRID LABELS

A. Description: Clear label with black lettering 3/8” high letters.
   1. Identifying valve above ceiling.
   2. Identifying mechanical equipment or filter replacement location.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.

3.02 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install plastic pipe markers in accordance with manufacturer's instructions.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

D. Use tags on piping 3/4 inch 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 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.

E. Locate ceiling grid labels to locate valves, dampers, filters, etc. above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 09 90 00 - Painting and Coating: Painting insulation jacket.

C. Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

D. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

C. 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).

D. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).

E. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).

F. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

G. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).

H. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

I. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.

J. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.

K. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

L. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2012.

M. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2022.

N. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).

O. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

P. ASTM D1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2020.

Q. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.

R. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

S. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a

T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager's General 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.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum five years of 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 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

A. Manufacturers:
   1. Knauf Insulation: www.knaufusa.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Owens Corning Corp: www.owenscorning.com.
   4. CertainTeed Corporation: www.certainteed.com.
   5. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 850 degrees F.
   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-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive:
   1. Compatible with insulation.

F. Insulating Cement/Mastic:
   1. ASTM C195; hydraulic setting on mineral wool.

G. Fibrous Glass Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 5x5.

H. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

I. Insulating Cement:
   1. ASTM C449/C449M.

2.03 JACKETS

A. PVC Plastic.
   1. Manufacturers:
      a. Johns Manville Corporation; www.jm.com.
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.
   3. Covering Adhesive Mastic:
      a. Compatible with insulation.

B. ABS Plastic:
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: -40 degrees F.
      b. Maximum Service Temperature of 180 degrees F.
      c. Moisture Vapor Permeability: 0.012 perm inch, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 30 mil.
      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 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, 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 or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H. 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.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.

4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

L. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

M. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

N. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.03 SCHEDULES

Piping System Type	Fluid Temp Range	Insulation Thickness For Pipe Sizes (inches)

		To 1"	1"-1-1/4"	1-1/2"-4"	5"-6"	8" & up
Domestic Water	40-70 F	.5	1.0	1.0	1.0	1.5
Domestic Hot Water		1.0	1.0	1.5	1.5	1.5
Storm Drainage			1.0	1.0	1.0	1.5

A. Plumbing Systems:
1. Domestic Hot Water Supply:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: See schedule.
      2) Thickness: See schedule.
2. Domestic Hot Water Recirculation:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: See schedule.
      2) Thickness: See schedule.
3. Domestic Cold Water:
   a. Glass Fiber Insulation
      1) Pipe Size Range: See schedule.
      2) Thickness: See schedule.
4. Plumbing Vents Within 10 Feet of the Exterior:
   a. Glass Fiber Insulation:
      1) Thickness: 1 inch.

END OF SECTION

SECTION 22 08 00

COMMISSIONING OF PLUMBING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Construction Manager's General Conditions and Division 01 Specification Sections, apply to this Section.

B. Refer to Division 01 Section "General Commissioning Requirements" for detailed explanation of commissioning work. Referenced Section also contains sample Cx Plan, construction checklist and functional test.

1.02 SUMMARY

A. This Section identifies the specific plumbing systems commissioning scope. The commissioning process is described in detail in the Cx Plan (refer to Section 01 09 13 - General Commissioning Requirements).

1.03 RELATED SECTIONS

A. Section 01 09 13 - General Commissioning Requirements: General requirements for commissioning processes that apply to this Section.

B. Section 23 08 00 - Commissioning of HVAC: HVAC systems commissioning requirements.

C. Section 26 08 00 - Commissioning of Electrical Systems: Electrical systems commissioning requirements.

1.04 SYSTEMS TO BE COMMISSIONED

A. Refer to the Commissioning Plan (see Section 01 09 13 - General Commissioning Requirements).
   1. The following systems will be commissioned:
      a. Pluming piping testing, cleaning, and flushing.

1.05 SUBMITTALS

A. The following submittals are in addition to those specified in Section 01 09 13 - General Commissioning Requirements:
   1. Testing Procedures: CxA shall submit detailed testing plan, procedures, and checklists for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.
   2. Certificate of Readiness: CxA shall compile certificates of readiness from Contractor certifying that systems, subsystems, equipment, and associated controls are ready for testing.
   3. Certificate of Completion of Installation, Prestart, and Startup: CxA shall certify that installation, prestart, and startup activities have been completed.
   4. Certified Pipe Cleaning and Flushing Report: Contractors shall certify that pipe cleaning, flushing, hydrostatic testing, and chemical treating have been completed. CxA shall Verify reports.
   5. Test and Inspection Reports: Contractors shall provide completed Test and Inspection Reports. CxA shall compile and submit test and inspection reports and certificates, and shall include them in systems manual and commissioning report.
   6. Corrective Action Documents: Contractors shall provide documentation that corrective action, when required, has been completed. CxA shall review and approved corrective action documents.
   7. Certified TAB Reports: Contractor shall provide certified TAB reports, the CxA shall review and comment on certified TAB reports and include in final Commissioning Report.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 TESTING PREPARATION

A. Prerequisites for Testing (Completed by Contractor):
   1. Certify that Plumbing systems, subsystems, and equipment have been completed, calibrated, and started; are operating according to the OPR, BoD, and Contract Documents; and that Certificates of Readiness are signed and submitted.
   2. Certify that TAB procedures have been completed, and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.

3. Test systems and intersystem performance after approval of test checklists for systems, subsystems, and equipment.
4. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shut down, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
5. Verify each operating cycle after it has been running for a specified period and is operating in a steady-state condition.
6. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable, or failed. Repeat this test for each operating cycle that applies to system being tested.
7. Annotate checklist or data sheet when a deficiency is observed.

3.02 TESTING

A. Test systems and intersystem performance after test checklists for systems, subsystems, and equipment have been approved.

B. Perform tests using design conditions whenever possible.
1. Simulate conditions by imposing an artificial load when it is not practical to test under design conditions and when written approval for simulated conditions is received from CxA. Before simulating conditions, calibrate testing instruments. Set and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
2. Alter set points when simulating conditions is not practical and when directed by CxA.
3. Alter sensor values with a signal generator when design or simulating conditions and altering set points are not practical. Do not use sensor to act as signal generator to simulate conditions or override values.

C. Scope of Plumbing Contractor Testing:
1. Testing scope shall include entire Plumbing installation.
2. Test all operating modes, interlocks, control responses, responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Detailed Testing Procedures: CxA, with Plumbing Contractor, TAB Contractor, and HVAC Instrumentation and Control Contractor, shall prepare detailed testing plans, procedures, and checklists for HVAC systems, subsystems, and equipment.

E. Domestic Water Testing and Acceptance Procedures: Testing requirements are specified in Division 22 Plumbing, General Purpose Sections. Provide test data and inspector record for review by CxA & inclusion in systems manual.

F. Pipe cleaning, flushing, and hydrostatic test requirements are specified in Section 22 10 05 - Plumbing Piping. Plumbing Contractor shall prepare pipe system cleaning, flushing, and hydrostatic testing. CxA shall review and comment on plan and final reports. CxA shall certify that pipe cleaning, flushing, hydrostatic tests, and chemical treatment have been completed. Plan shall include the following:
1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed Drawings for each pipe sector showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

G. Plumbing Piping Distribution System Testing: Plumbing Contractor shall prepare a testing plan to verify performance of domestic water, systems; special fixtures; and other distribution systems. Plan shall include the following:
1. Sequence of testing and testing procedures for each item of equipment and section of pipe to be tested, identified by identification marker. Markers shall be keyed to Drawings showing the physical location of each item of equipment and pipe test section. Drawings shall be formatted to allow each item of equipment and section of piping to be physically located and identified when referred to in the system testing plan.
2. Tracking checklist for managing and ensuring that all pipe sections have been tested.

H. Deferred Testing:
   1. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, the deficiency shall be documented and reported to Owner. Deficiencies shall be resolved and corrected by appropriate parties and test rescheduled.
   2. If the testing plan indicates specific seasonal testing, appropriate initial performance tests shall be completed and documented and additional tests scheduled.

END OF SECTION

SECTION 22 10 05

PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Storm water.
   4. Natural Gas.

1.02 RELATED REQUIREMENTS

A. Section 07 54 00 - Thermoplastic Membrane Roofing: Roof penetrations and pipe supports.

B. Section 07 84 00 - Firestopping.

C. Section 09 90 00 - Painting and Coating.

D. Section 22 05 53 - Identification for Plumbing Piping and Equipment.

E. Section 22 07 19 - Plumbing Piping Insulation.

F. Section 22 40 00 - Plumbing Fixtures.

G. Division 26 - Electrical: Electrical characteristics and wiring connections.

H. Section 31 23 01 - Excavating Filling and Grading.

1.03 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems; 2015 (Reaffirmed 2020).

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

C. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2021.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

E. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; 2021.

F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV; 2021.

G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.

H. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings- DWV; 2017.

I. ASME B31.1 - Power Piping; 2022.

J. ASME B31.3 - Process Piping; 2022.

K. ASME B31.9 - Building Services Piping; 2020.

L. ASSE 1003 – Performance Requirements for Water Pressure Reducing Valves for Potable Water Distribution Systems; 2020.

M. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

N. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.

O. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

P. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.

Q. ASTM B32 - Standard Specification for Solder Metal; 2020.

R. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2020.

S. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2019.

T. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.

U. ASTM B88/B88M - Standard Specification for Seamless Copper Water Tube; 2022.

V. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2020.

W. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter; 2022.

X. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2021.

Y. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.

Z. ASTM D2609 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe; 2021.

AA. ASTM D2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.

BB. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing; 2020.

CC. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2021.

DD. 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.

EE. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2021.

FF. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014 (Reapproved 2021).

GG. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association; 2007 (ANSI/AWWA C111/A21.11).

HH. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; 2017.

II. AWWA C651 - Disinfecting Water Mains; 2014, with Addendum (2020).

JJ. 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.

KK. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.

LL. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.

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

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

OO. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends; 2011.

PP. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.

QQ. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2019.

RR. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends; 2011.

SS. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2010, with Errata.

TT. NFPA 58 - Liquified Petroleum Gas Code; 2020, with Amendment.

UU. NSF 61 - Drinking Water System Components - Health Effects; 2023 with Errata.

VV. NSF 372 - Drinking Water System Components - Lead Content; 2022.

WW. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe; 2021.

1.04 SUBMITTALS

A. See Construction Manager's General 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. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.05 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.

C. Welder Qualifications: Certified in accordance with ASME (BPV IX).

D. 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 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 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.02 SANITARY SEWER 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.

2.03 WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Fittings: Cast iron, coated.
   3. Joints: ASTM B32, alloy Sn95 solder.
   4. Joints: Grooved mechanical couplings.
   5. Mechanical Press Sealed Fittings: Double pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, non toxic synthetic rubber sealing elements.
      a. Manufacturers:
         1) Grinnell Mechanical Products, a Tyco International Company; www.grinnell.com.
         2) Viega LLC; www.viega.com.

2.04 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.05 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.06 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: NFPA 54, threaded or welded to ASME B31.1.

2.07 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes two (2) inch and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over two (2) inch:
   1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. 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: Malleable iron or ductile iron, galvanized.
   3. Gasket Material: EPDM suitable for operating temperature range from -30 degrees F to 230 degrees F.
   4. Gasket Material: Nitrile rubber suitable for operating temperature range from -20 degrees F to 180 degrees F.
   5. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
   6. When pipe is field grooved, provide coupling manufacturer's grooving tools.
   7. Manufacturers:
      a. Grinnell Mechanical Products, a Tyco International Company: www.grinnell.com.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.08 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.
   5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
   6. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
      a. Bases: High density polypropylene.
      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 under pipe to top of roofing.
      f. Manufacturers:
         1) PHP Systems/Design; PHP Pipe Supports: www.phpsd.com.

B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
   4. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   3. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.

4. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
8. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
10. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
11. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: 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.
7. Manufacturers:
   a. Powers Fasteners, Inc: www.powers.com.

E. Shields:
1. Shield for Insulated Piping 2 Inches and Smaller: 18 gauge galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.
2. Shield for Insulated Piping 2-1/2 Inches and Larger (Except Cold Water Piping): Pipe covering protective saddles.
3. Shields for Insulated Cold Water Piping 2-1/2 Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.

2.09 GATE VALVES

A. Manufacturers:
1. Conbraco Industries; www.apollovalves.com.
2. Crane Company: www.cranevalve.com.
3. Hammond Valve Company: www.hammondvalve.com.Nibco, Inc: www.nibco.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.
5. Mueller Water Products, Inc: www.muellerwaterproducts.com.
6. Nibco, Inc: www.nibco.com.
7. Tyco Flow Control: www.tycoflowcontrol.com.
8. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Up To and Including two (2) inches:
1. MSS SP-80, Class 125, bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder ends.

C. 2 Inches and Larger:
1. MSS SP-70, Class 125, iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

2.10 BALL VALVES

A. Manufacturers:
1. Conbraco Industries: www.apollovalves.com.
2. Crane Company:Nibco, Inc: www.cranevalve.com.
3. Hammond Valve Company: www.hammondvalve.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.

5. Mueller Water Products, Inc: www.muellerwaterproducts.com.
6. Nibco, Inc: www.nibco.com.
7. Tyco Flow Control: www.tycoflowcontrol.com.
8. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Construction, two (2) inches and Smaller: MSS SP-110, CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.

C. Over 2 Inches: Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, flanged or grooved ends.

2.11 GAS COCKS

A. Manufacturers:
1. Crane CompanyNibco, Inc: www.cranevalve.com.www.nibco.com.
2. Hammond Valve Company: www.hammondvalve.com.
3. Mueller Water Products, Inc: www.muellerwaterproducts.com.
4. Nibco, Inc: www.nibco.com.
5. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Up to 2 Inches: Bronze body, bronze tapered plug (non-lubricated), teflon packing, threaded ends.

C. Over 2 Inches: Cast iron body and plug, non-lubricated, teflon packing, flanged ends.

D. Gas valves must meet AGA approval standards.

E. Construction 2-1/2 Inches and Larger: MSS SP-78, 175 psi CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

F. Construction 2-1/2 Inches and Larger: MSS SP-78, CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

2.12 BUTTERFLY VALVES

A. Manufacturers:
1. Crane Valve: www.cranevalve.com.
2. Hammond Valve Company: www.hammondvalve.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Mueller Water Products, Inc: www.muellerwaterproducts.com.
5. Tyco Flow Control: www.tycoflowcontrol.com.
6. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Construction 1-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, 10 position lever handle.

C. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

2.13 FLOW CONTROLS

A. Manufacturers:
1. ITT Bell & Gossett: www.bellgossett.com.
2. Griswold Controls: www.griswoldcontrols.com.
3. Taco, Inc: www.taco-hvac.com.
4. Crane Company: www.cranevalve.com.
5. Hammond Valve Company: www.hammondvalve.com.
6. Mueller Water Products, Inc: www.mullerwaterproducts.com.
7. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi psi.

2.14 SWING CHECK VALVES

A. Manufacturers:
   1. Conbraco Industries: www.conbraco.com.
   2. Hammond Valve: www.hammondvalve.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.
   4. Mueller Water Products, Inc: www.muellerwaterproducts.com.
   5. Nibco, Inc: www.nibco.com.
   6. Tyco Flow Control: www.tycoflowcontrol.com.
   7. Victaulic Company: www.victaulic.com.
   8. Watts Regulator Company: www.wattsregulator.com.
   9. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Up to 2 Inches:
   1. MSS SP-80, Class 125, bronze body and cap, bronze swing disc with rubber seat, solder ends.

C. Over 2 Inches:
   1. MSS SP-71, Class 125, iron body, bronze swing disc, renewable disc seal and seat, flanged or grooved ends.

2.15 PRESSURE AND TEMPERATURE RATINGS

A. Unless otherwise indicated, use valves suitable for 125 minimum psig working pressure and 450 degrees F.

B. Valves for fire protection suitable for 175 psig working pressure.

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 ball valves for shut-off and isolating service. Install valves on all equipment, major branch lines, and as shown on drawings.

G. Provide drain valves at main shut-off valves, and low points of piping and apparatus. Include drain valves and piping to a point of drainage for all hydronic coils. Hose thread fittings shall be acceptable for a drain connection, if piping is not indicated on drawings.

H. Provide spring loaded check valves on discharge of pumps.

I. Use plug cocks for gas service.

J. Use ball valves or code approved balancing valves in water systems for throttling service.

K. Use butterfly valves for hydronic service interchangeably with gate and globe valves.

L. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 07 19.

M. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 19.

N. Provide access where valves and fittings are not exposed.

O. Install vent piping penetrating roofed areas to maintain integrity of roof assembly; refer to Section 07 54 00.

P. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

Q. Provide support for utility meters in accordance with requirements of utility companies.

R. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 90 00.

S. Install valves with stems upright or horizontal, not inverted.

T. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

U. Install water piping to ASME B31.9.

V. Sleeve pipes passing through partitions, walls and floors.

W. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

X. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   8. Provide copper plated hangers and supports for copper piping.
   9. Prime coat exposed steel hangers and supports. Refer to Section 09 90 00. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
   10. Support cast iron drainage piping at every joint.

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. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

D. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E. Provide spring loaded check valves on discharge of water pumps.

F. Provide plug valves in natural gas systems for shut-off service.

G. Provide flow controls in water recirculating systems where indicated.

3.05 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure 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.

3.07 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches to 1-1/4 inches:
         1) Maximum hanger spacing: 6.5 ft.
         2) Hanger rod diameter: 3/8 inches.
      b. Pipe size: 1-1/2 inches to 2 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 3/8 inch.
      c. Pipe size: 2-1/2 inches to 3 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 1/2 inch.
      d. Pipe size: 4 inches to 6 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 5/8 inch.
   2. Plastic Piping:
      a. All Sizes:
         1) Maximum hanger spacing: 6 ft.
         2) Hanger rod diameter: 3/8 inch.

END OF SECTION

SECTION 22 10 06
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floor drains.

B. Cleanouts.

C. Hose bibbs.

D. Water hammer arrestors.

E. Trap seal primers.

1.02 RELATED REQUIREMENTS

A. Section 22 10 05 - Plumbing Piping.

B. Section 22 40 00 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS

A. ASME A112.6.3 - Floor and Trench Drains; 2019.

B. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2017.

C. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent; 2021.

D. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies; 2021.

E. ASSE 1019 - Performance requirements for Wall Hydrant with Backflow Protection and Freeze Resistant; 2011; (Reaffirmed 2016).

F. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.

G. NSF 372 - Drinking Water System Components - Lead Content; 2022.

H. PDI-WH 201 - Water Hammer Arresters; 2017.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements, for submittal procedures.

B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Loose Keys for Outside Hose Bibbs: Two.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 DRAINS

A. Manufacturers:
   1. Josam Company: www.josam.com.
   2. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
   3. MIFAB: www.mifab.com.
   4. Zurn Industries, Inc: www.zurn.com.

B. Floor Drain (FD):
   1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

2.02 CLEANOUTS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
   2. Josam Company: www.josam.com.
   3. Zurn Industries, Inc: www.zurn.com.

B. Cleanouts at Exterior Surfaced Areas:
   1. Round cast nickel bronze access frame and non-skid cover.

C. Cleanouts at Exterior Unsurfaced Areas:
   1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D. Cleanouts at Interior Finished Floor Areas:
   1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

E. Cleanouts at Interior Finished Wall Areas:
   1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.03 HOSE BIBBS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company; www.jayrsmith.com.
   2. Watts Regulator Company; www.wattsregulator.com.
   3. Zurn Industries, Inc; www.zurn.com.

B. Interior Hose Bibbs:
   1. Bronze or brass with integral mounting flange, replaceable hexagonal disc, hose thread spout, chrome plated where exposed with handwheel, integral vacuum breaker in conformance with ASSE 1011.

2.04 WATER HAMMER ARRESTORS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
   2. Watts Regulator Company: www.wattsregulator.com.
   3. Zurn Industries, Inc: www.zurn.com.

B. Water Hammer Arrestors:
   1. Copper construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psi working pressure.

2.05 TRAP SEAL PRIMER VALVES

A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
   1. Acceptable Manufacturers
      a. Josam Co.
      b. MIFAB Manufacturing Co.
      c. Precision Plumbing Products, Inc.
      d. Smith, Jay R. Mfg. Co.
      e. Tyler Pipe; Wade Div.
      f. Watts Industries, Inc.
      g. Zurn Industries
   2. 125 psig (860 kPa) minimum working pressure.
   3. Bronze body with atmospheric-vented drain chamber.
   4. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union or solder joint.
   5. Gravity Drain Outlet Connection: NPS 3/4 (DN 15) threaded or solder joint.
   6. Finish: Chrome-plated; or rough bronze for units used with pipe or tube that is not chrome finished

B. Drainage-Type Trap Seal Primer Valves; ASSE 1440, fixture-trap, waste-drainage-fed type, with the following characteristics:

1. Acceptable Manufacturers:
    a. Smith, Jay R. Mfg. Co.
    b. Design Professional Approved Equivalent
2. Chrome-plated, cast-brass, NPS 1-1/4 (DN 32) minimum, lavatory P-trap with NPS 3/8 (DN 10) minimum, trap makeup connection.

C. Trap Seal Primer System: Factory-fabricated, automatic-operation assembly for wall mounting with the following characteristics:
1. Acceptable Manufacturers:
    a. Precision Plumbing Products, Inc.
    b. Design Professional Approved Equivalent.
2. Piping: NPS 3/4, ASTM B 88, Type L (DN 20, ASTM B 88M, Type B); copper, water tubing inlet and outlet with PEX-type piping..
3. Cabinet: Steel box with Stainless steel cover.
4. Electric Controls: 24-Hour timer, solenoid valve and manual switch for 120 VAC power.
5. Water Hammer Arrester: ASSE 1010.
6. Vacuum Breaker: ASSE 1001

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Install floor cleanouts at elevation to accommodate finished floor.

D. Pipe relief from backflow preventer to nearest drain.

E. Provide trap seal primer at all new floor drains, ASSE 1018 or ASSE 1044. Install trap primer at each floor drain (No distribution unit).

F. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories sinks and other fixtures as needed.

G. Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water closets.

B. Urinals.

C. Lavatories.

D. Sinks.

E. Service sinks.

F. Electric water coolers.

G. Showers.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Seal fixtures to walls and floors.

B. Section 22 10 05 - Plumbing Piping.

C. Section 22 10 06 - Plumbing Piping Specialties.

1.03 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; 2024.

E. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2018.

F. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018, with Errata.

G. ASME A112.19.5 – Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

I. ISFA-2 - Classification and Standards for Solid Surfacing Material; 2013.

J. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C. Samples: Submit two sets of color chips for each standard color.

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

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.07 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.

1.08 WARRANTY

A. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 HIGH SCHOOL

A. FLUSH VALVE AER CLOSETS (WC-1 AND WC-2) (EXSITNG REINSTALL)

1. Existing fixture to be reinstalled.

B. FLUSH VALVE WATER CLOSETS (WC-3) (NEW)

1. Manufacturers:
   a. American Standard Inc: www.americanstandard.com.
   b. Kohler Company: www.kohlerco.com.
   c. Zurn Industries, Inc: www.zurn.com.
2. Water Closets: Vitreous china, ASME A112.19.2, elongated rim, floor mounted, 15 inches high, siphon jet flush action, china bolt caps.
3. Flush Valves Manufacturers:
   a. Delany Products: www.delanyvalve.com.
   b. Sloan Valve Company: www.sloanvalve.com.
   c. Zurn Industries, Inc: www.zurn.com.
4. Exposed Flush Valve:
   a. ASME A112.18.1; exposed chrome plated, diaphragm type with oscillating handle, escutcheon, integral screwdriver stop and vacuum breaker; maximum 1.6 gallon flush volume.
5. Seats:
   a. Manufacturers:
      1) Bemis Manufacturing Company: www.bemismfg.com.
      2) Church Seat Company: www.churchseats.com.
      3) Zurn Industries, Inc: www.zurn.com.
   b. Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts.

C. WALL HUNG URINALS (UR-1) (NEW)

1. Wall Hung Urinal Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Kohler Company: www.kohler.com.
   c. Zurn Industries, Inc: www.zurn.com.
2. Urinals: ASME A112.19.2; vitreous china, wall hung washout urinal with shields, integral trap, removable stainless-steel strainer, top spud, steel supporting hanger.
   a. Flush Volume: 0.125 gallon, maximum.
   b. Flush Style: Washout.
   c. Flush Valve: Exposed (top spud).
   d. Removable stainless steel strainer.
   e. Supply Size: 3/4 inch.
   f. Outlet Size: 2 inches.
3. Flush Valves: ASME A112.18.1; exposed chrome plated, diaphragm type with oscillating handle, escutcheon, integral screwdriver stop and vacuum breaker; maximum and accessories.
   a. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
   b. Manufacturers:
      1) Delany Products: www.delanyvalve.com
      2) Sloan Valve Company: www.sloanvalve.com.
      3) Zurn Industries, Inc: www.zurn.com.
4. Accessories:
   a. Carriers:
      1) Manufacturers:
         (a) JOSAM Company: www.josam.com.
         (b) Jay R. Smith Mfg. Co., Division of Smith Industries: www.jrsmith.com.

(c) Zurn Industries, Inc: www.zurn.com.

2) ASME A112.6.1M; concealed arm supports, bearing plate and studs.

D. WALL HUNG URINALS (UR-2) (NEW AT EXSITNG SUPPORTS)

1. Wall Hung Urinal Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Kohler Company: www.kohler.com.
   c. Zurn Industries, Inc: www.zurn.com.
2. Urinals: ASME A112.19.2; vitreous china, wall hung washout urinal with shields, integral trap, removable stainless-steel strainer, top spud, steel supporting hanger.
   a. Flush Volume: 0.125 gallon, maximum.
   b. Flush Style: Washout.
   c. Flush Valve: Exposed (top spud).
   d. Removable stainless steel strainer.
   e. Supply Size: 3/4 inch.
   f. Outlet Size: 2 inches.
3. Flush Valves: ASME A112.18.1; exposed chrome plated, diaphragm type with oscillating handle, escutcheon, integral screwdriver stop and vacuum breaker; maximum and accessories.
   a. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
   b. Manufacturers:
      1) Delany Products: www.delanyvalve.com
      2) Sloan Valve Company: www.sloanvalve.com.
      3) Zurn Industries, Inc: www.zurn.com.

E. LAVATORIES (L-1) (EXISTING REINSTALL WITH NEW FAUCET)

1. Supply Faucet Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Faucet to match school standard.
2. Supply Faucet:
   a. ASME A112.18.1; chrome plated supply fitting with offset open grid strainer, water economy aerator with maximum 2.0 gpm flow, single lever handle.
   b. Mixing Valve: Internal, automatic.
   c. Water Supply: 3/8 inch compression connections.
   d. Aerator: Vandal resistant, 0.5 GPM, laminar flow device.
3. Accessories:
   a. Provide ASSE 1070 mixing valve.
   b. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
   c. Offset waste with perforated open strainer.
   d. Loose key stops.
   e. Flexible supplies.
   f. Truebro LAV SHIELD (field verify mounting with existing wall supports)
   g. Carrier:
      1) Manufacturers:
         (a) JOSAM Company: www.josam.com.
         (b) Jay R. Smith Mfg. Co., Division of Smith Industries: www.jrsmith.com.
         (c) Zurn Industries, Inc: www.zurn.com.

F. LAVATORIES (L-2) (EXISTING REINSTALL WITH EXISTING FAUCET)

1. Lavatory Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Kohler Company: www.kohler.com.
   c. Mansfield Plumbing Products LLC: www.mansfieldplumbing.com.
   d. Zurn Industries, Inc: www.zurn.com.
2. Vitreous China Wall Hung Basin:
   a. ASME A112.19.2; vitreous china wall hung lavatory 20 x 18 inch minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
      1) Drilling Centers: 4 inch.

3. Supply Faucet Manufacturers:
    a. American Standard, Inc: www.americanstandard-us.com.
    b. Faucet to match school standard.
4. Supply Faucet:
    a. ASME A112.18.1; chrome plated supply fitting with offset open grid strainer, water economy aerator with maximum 2.0 gpm flow, single lever handle.
    b. Mixing Valve: Internal, automatic.
    c. Water Supply: 3/8 inch compression connections.
    d. Aerator: Vandal resistant, 0.5 GPM, laminar flow device.
5. Accessories:
    a. ASME A112.6.1M; concealed arm supports, bearing plate and studs
    b. Provide ASSE 1070 mixing valve.
    c. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
    d. Offset waste with perforated open strainer.
    e. Loose key stops.
    f. Flexible supplies.
    g. Truebro LAV SHIELD (field verify mounting with existing wall supports)
    h. Carrier:
        1) Manufacturers:
            (a) JOSAM Company: www.josam.com.
            (b) Jay R. Smith Mfg. Co., Division of Smith Industries: www.jrsmith.com.
            (c) Zurn Industries, Inc: www.zurn.com.

G. LAVATORIES (L-3) (NEW AT EXSITNG LOCATION)

1. Lavatory Manufacturers:
    a. American Standard, Inc: www.americanstandard-us.com.
2. Vitreous China Wall Hung Basin:
    a. ASME A112.19.2; vitreous china wall hung lavatory 20 x 18 inch minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
        1) Drilling Centers: 4 inch.
3. Supply Faucet Manufacturers:
    a. American Standard, Inc: www.americanstandard-us.com.
    b. Faucet to match school standard.
4. Supply Faucet:
    a. ASME A112.18.1; chrome plated supply fitting with offset open grid strainer, water economy aerator with maximum 2.0 gpm flow, single lever handle.
    b. Mixing Valve: Internal, automatic.
    c. Water Supply: 3/8 inch compression connections.
    d. Aerator: Vandal resistant, 0.5 GPM, laminar flow device.
5. Accessories:
    a. ASME A112.6.1M; concealed arm supports, bearing plate and studs.
    b. Provide ASSE 1070 mixing valve.
    c. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
    d. Offset waste with perforated open strainer.
    e. Loose key stops.
    f. Flexible supplies.
    g. Truebro LAV SHIELD (field verify mounting with existing wall supports)

H. SINK (S-1)

1. Manufacturers:
    a. Advance Tabco: www.advancetabco.com.
    b. Elkay Manufacturing Company: www.elkay.com.
    c. Just Manufacturing: www.justmfg.com.
2. Single Compartment Bowl:
    a. ASME A112.19.3; 18 x 18 x 12 inch bowl with drain board,18 gage thick, Type 304 stainless steel, tile edge splash, rolled edge, with ledge back drilled for 8” center faucet.

b. Drain: 1 1/2 inch chromed brass drain.

3. Trim:
   a. ASME A112.18.1; chrome plated brass back slash mounted faucet, with high rise swing spout, wrist blades, 8” centers vandal proof water economy aerator maximum 2.0 gpm flow, single.
   b. Equivalent to Model K-101 manufactured by Advance Tabco or equal by American Standard, Chicago or Kohler
4. Accessories:
   a. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, wheel handle ball valve stops, flexible supplies.
5. Plaster Trap:
   a. Jay R Smith model 8710T, 1 1/2" outlet, Duco coated cast iron, Cast aluminum bucket strainer, gasket cover or equal by Zurn.

2.01 FLOYD ELEMENTARY SCHOOL

A. SINK (S-1)

1. Sink Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Elkay Manufacturing Company: www.elkay.com.
   c. Just Manufacturing: www.justmfg.com.
   d. Kohler Company: www.kohler.com.
2. Sink Bowl:
   a. ASME A112.19.3; 22”x19-1/2”x5-1/2”outside dimensions 18 gage thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
   b. Drain: 1-1/2 inch chromed brass drain.
   c. Drain: 3-1/2 inch crumb cup and tailpiece.
3. Trim:
   a. ASME A112.18.1; chrome plated brass supply with goose neck spout, vandal proof water economy aerator with maximum 1.0 gpm flow, manual faucet with wrist blades. Field adjustable rigid/swing adjustment on spout.
4. Accessories:
   a. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.
   b. 3M aqua pure 3MFF100, NSF 42 and 53 lead filter

B. SERVICE SINKS (SS)

1. Manufacturers:
   a. American Standard Inc: www.americanstandard.com.
   b. Kohler Company: www.kohlerco.com.
   c. Zurn Industries: www.zurn.com.
2. Bowl:
   a. ASME A112.19.1M; 24 x 24 x 10 deep, modeled one piece with one (1) inch wide shoulders stainless steel rim guard and stainless steel strainer.
3. Trim:
   a. ASME A112.18.1 exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges. Manufactured by Delta, Speakman or Florestone.
4. Accessories:
   a. 5 feet of 1/2 inch diameter plain end reinforced rubber hose.
   b. Hose clamp hanger.
   c. Wall guard.

2.02 MIDDLE SCHOOL

A. FLUSH VALVE WATER CLOSETS (WC-1 & WC-2)

1. Water Closet Manufacturers:
   a. American Standard Inc: www.americanstandard.com.
   b. Kohler Company: www.kohlerco.com.

c. Zurn Industries, Inc: www.zurn.com.

2. Water Closets: Vitreous china, ASME A112.19.2, elongated rim, wall hung, siphon jet flush action, china bolt caps.
   a. WC-1 Height: 15 inches minimum.
   b. WC-2 Height: 17 inches.
   c. Flush Valve: Exposed (top spud).
   d. Flush Operation: Sensor operated.
   e. Handle Height: 44 inches or less.
   f. Supply Size: 1-1/2 inches.
   g. Outlet Size: 2 inches.
   h. Color: White.
3. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
   a. Sensor-Operated Type: Solenoid operator, low voltage hard-wired, infrared sensor and over-ride push button.
   b. Concealed Type: Rough brass, exposed parts chrome plated, wall escutcheon, wheel handle stop.
   c. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
   d. Metering Type: Easily accessible adjustment nut.
   e. Manufacturers:
      1) American Standard, Inc: www.americanstandard-us.com.
      2) Delany Products: www.delanyvalve.com.
      3) Sloan Valve Company: www.sloanvalve.com.
      4) Zurn Industries, Inc: www.zurn.com.
4. Flush Valve Manufacturers:
   a. Kohler Company: www.kohler.com.
   b. Sloan Valve Company: www.sloanvalve.com.
   c. Zurn Industries, Inc: www.zurn.com.
5. Exposed Flush Valve: ASME A112.18.1; exposed chrome plated, diaphragm type.
   a. Flush Volume: 1.6 gallon, maximum.
   b. Flush Valve: Exposed (top spud).
   c. Flush Operation: Sensor operated.
   d. ASME A112.18.1; exposed chrome plated, diaphragm type with oscillating handle, escutcheon, seat bumper, integral screwdriver stop and vacuum breaker; maximum 1.6 gallon flush volume.
6. Sensor Operated Flush Valve:
   a. ASME A112.18.1; concealed rough brass, diaphragm type with battery operated solenoid operator, infrared sensor and over-ride button in chrome plated plate, wheel handle stop and vacuum breaker; maximum 1.6 gallon flush volume.
7. Seats:
   a. Manufacturers:
      1) Bemis Manufacturing Company: www.bemismfg.com.
      2) Church Seat Company: www.churchseats.com.
      3) Olsonite; Model 10CC-AM-FR: www.olsonite.com.
      4) Zurn Industries, Inc: www.zurn.com.
   b. Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts, with cover.
8. Water Closet Carriers:
   a. Manufacturers:
      1) JOSAM Company: www.josam.com.
      2) Zurn Industries, Inc: www.zurn.com.
   b. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

B. WALL HUNG URINALS (UR-1) (NEW)

1. Wall Hung Urinal Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Kohler Company: www.kohler.com.

c. Zurn Industries, Inc: www.zurn.com.

2. Urinals: ASME A112.19.2; vitreous china, wall hung washout urinal with shields, integral trap, removable stainless-steel strainer, top spud, steel supporting hanger.
   a. Flush Volume: 0.125 gallon, maximum.
   b. Flush Style: Washout.
   c. Flush Valve: Exposed (top spud).
   d. Removable stainless steel strainer.
   e. Supply Size: 3/4 inch.
   f. Outlet Size: 2 inches.
3. Flush Valves: ASME A112.18.1; exposed chrome plated, diaphragm type with oscillating handle, escutcheon, integral screwdriver stop and vacuum breaker; maximum and accessories.
   a. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
   b. Manufacturers:
      1) Delany Products: www.delanyvalve.com
      2) Sloan Valve Company: www.sloanvalve.com.
      3) Zurn Industries, Inc: www.zurn.com.
4. Carrier:
   a. Manufacturers:
      1) JOSAM Company: www.josam.com.
      2) Jay R. Smith Mfg. Co., Division of Smith Industries: www.jrsmith.com.
      3) Zurn Industries, Inc: www.zurn.com.
   b. ASME A112.6.1M; concealed arm supports, bearing plate and studs.

C. LAVATORIES (L-1)

1. Lavatory Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
2. Vitreous China Counter Mounted Basin: ASME A112.19.2; vitreous china oval basin with, front overflow, and soap depression.
   a. Drilling Centers: 4 inch.
3. Supply Faucet Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Faucet to match school standard.
4. Supply Faucet: ASME A112.18.1; chrome plated supply fitting with offset open grid strainer, water economy aerator with maximum 2.0 gpm flow, single lever handle.
   a. Mixing Valve: Internal, automatic.
   b. Water Supply: 3/8 inch compression connections.
   c. Aerator: Vandal resistant, 0.5 GPM, laminar flow device.
5. Accessories:
   a. Provide ASSE 1070 mixing valve.
   b. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
   c. Offset waste with perforated open strainer.
   d. Loose key stops.
   e. Flexible supplies.

D. LAVATORIES (L-2)

1. Lavatory Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
2. Vitreous China Wall Hung Basin: ASME A112.19.2; vitreous china wall hung lavatory 20 x 18 inch minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
   a. Drilling Centers: 4 inch.
3. Supply Faucet Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com.
   b. Faucet to match school standard.
4. Supply Faucet: ASME A112.18.1; chrome plated supply fitting with offset open grid strainer, water economy aerator with maximum 2.0 gpm flow, single lever handle.
   a. Mixing Valve: Internal, automatic.

b. Water Supply: 3/8 inch compression connections.
c. Aerator: Vandal resistant, 0.5 GPM, laminar flow device.

5. Accessories:
   a. Provide ASSE 1070 mixing valve.
   b. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
   c. Offset waste with perforated open strainer.
   d. Loose key stops.
   e. Flexible supplies.
   f. Truebro LAV SHIELD (field verify mounting with existing wall supports)
   g. ASME A112.6.1M; concealed arm supports, bearing plate and studs.

E. BARRIER-FREE SHOWER (SH-1)

1. Acceptable Manufacturers:
   a. American Standard Inc; FloWise Commercial Shower System: www.americanstandard.com.
   b. Bradley Corporation: www.bradleycorp.com.
   c. Powers Controls: www.powerscontrols.com.
   d. Symmons Industries, Inc: www.symmons.com.
2. Cabinet: Fold up seat, 1-1/2 inch O.D., 18 gauge, 304 stainless steel grab bars, stainless steel hardware, 18 gauge 304 stainless steel curtain rod, commercial grade vinyl shower curtain, self-caulking brass drain, and slip resistant floor; 45 inches by 38 inches by 84 inches high.
3. Trim: Pressure-balancing mixing valve with single blade lever handle and adjustable stop screw to limit handle turn; diverter with integral volume control; shower hand with arm and flange; Wall/hand shower with flexible metal hose, in-line vacuum breaker, wall connection and flange, 30 inch slide bar for hand shower mounting.

F. WALL-MOUNTED SHOWER SYSTEM (SH-2):

1. Acceptable Manufacturers:
   a. Bradley Corporation: www.bradleycorp.com.
   b. Powers Controls: www.powerscontrols.com.
   c. Symmons Industries, Inc: www.symmons.com.
2. Cabinet: Stainless steel, 18 gauge cover through ceiling with pressure balancing mixing valve, service stops, adjustable stop screw to limit handle turn, all brass vandal resistant head with ball joint mounted to institutional type head bracket. Provide with ceiling flange to conceal supplies to ceiling.
3. Shower Head: ASME A112.18.1; chrome plated vandal-proof institutional head with integral wall bracket, built-in 2.5 gpm flow control.

G. SERVICE SINKS

1. Manufacturers:
   a. American Standard Inc: www.americanstandard.com.
   b. Kohler Company: www.kohlerco.com.
   c. Zurn Industries: www.zurn.com.
2. Bowl: ASME A112.19.1M; 24 x 24 x 10 deep, modeled one piece with one (1) inch wide shoulders stainless steel rim guard and stainless steel strainer.
3. Trim: ASME A112.18.1 exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges. Manufactured by Delta, Speakman or Florestone.
4. Accessories:
   a. 5 feet of 1/2 inch diameter plain end reinforced rubber hose.
   b. Hose clamp hanger.
   c. Wall guard.

H. ELECTRIC WATER COOLER (EWC)

1. Manufacturers:
   a. Elkay Manufacturing Company: www.elkay.com.
   b. Haws Corporation: www.hawsco.com.
2. Fountain:

a. ARI 1010; surface bi level handicapped mounted electric water cooler with bottle filling station stainless steel top, stainless steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, push button, mounting bracket, refrigerated with integral air cooled condenser, NSF/ANSI 61&372 (lead free).
b. Capacity: 8.0 gpm of 50 degree F water with inlet at 80 degree F and room temperature of 90 degree F.
c. Water filter meeting NSF 42 and 53 lead filter requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 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. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 90 05, color to match fixture.

F. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

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

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

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.

3.08 SCHEDULES

A. Fixture Heights: Install fixtures to heights above finished floor as indicated.
1. Water Closet:
a. Standard: 15 inches to top of bowl rim.
b. Accessible: 18 inches to top of seat.
2. Water Closet Flush Valves:
a. Standard: 11 inches min. above bowl rim.
b. Recessed: 10 inches min. above bowl rim.
3. Urinal:
a. Standard: 22 inches to top of bowl rim.
b. Accessible: 17 inches to top of bowl rim.
4. Lavatory:
a. Standard: 31 inches to top of basin rim.

b. Accessible: 34 inches to top of basin rim.
c. RE: Drawings for additional height requirements.

5. Electric Water Cooler:
   a. Child: 30 inches to top of basin rim.
   b. Standard Adult: 40 inches to top of basin rim.
   c. Accessible: 36 inches to top of spout.
6. Shower Heads:
   a. Standard: 69.5 inches to bottom of head.
   b. Adult Female: 64.5 inches to bottom of head.
   c. Child: 58.5 inches to bottom of head.

B. Fixture Rough-In
1. Water Closet (Flush Valve Type):
   a. Cold Water: 1 Inch.
   b. Waste: 4 Inch.
   c. Vent: 2 Inch.
2. Urinal (Flush Valve Type):
   a. Cold Water: 3/4 Inch.
   b. Waste: 2 Inch.
   c. Vent: 1-1/2 Inch.
3. Lavatory:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 1-1/2 Inch.
   d. Vent: 1-1/4 Inch.
4. Sink:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 1-1/2 Inch.
   d. Vent: 1-1/4 Inch.
5. Service Sink:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 2 Inch.
   d. Vent: 1-1/2 Inch.
6. Electric Water Cooler:
   a. Cold Water: 1/2 Inch.
   b. Waste: 1-1/4 Inch.
   c. Vent: 1-1/4 Inch.
7. Shower:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 2 inch.
   d. Vent: 1-1/4 Inch.

END OF SECTION

SECTION 23 05 93

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 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 Standards for Testing, Adjusting, Balancing of Environmental Systems; 2026.

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; 2002.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Construction Manager and Design Professional.
   2. 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. Identification and types of measurement instruments to be used and their most recent calibration date.
      d. Final test report forms to be used.
      e. Detailed step-by-step procedures for TAB work for each system and issue, including:
         1) Terminal flow calibration (for each terminal type).
         2) Diffuser proportioning.
         3) Branch/submain proportioning.
         4) Total flow calculations.
         5) Rechecking.
         6) Diversity issues.
      f. Details of how TOTAL flow will be determined; for example:
         1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
         2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
      g. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
      h. Confirmation of understanding of the outside air ventilation criteria under all conditions.
      i. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
      j. Method of checking building static and exhaust fan and/or relief damper capacity.
      k. Proposed selection points for sound measurements and sound measurement methods.
      l. Methods for making coil or other system plant capacity measurements, if specified.
      m. Time schedule for TAB work to be done in phases (by floor, etc.).
      n. Description of TAB work for areas to be built out later, if any.
      o. Time schedule for deferred or seasonal TAB work, if specified.
      p. False loading of systems to complete TAB work, if specified.
      q. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.

r. Interstitial cavity differential pressure measurements and calculations, if specified.
s. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
t. Procedures for formal progress reports, including scope and frequency.
u. Procedures for formal deficiency reports, including scope, frequency and distribution.

C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB which affect the control system setup and operation.

D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Design Professional and for inclusion in operating and maintenance manuals.
3. 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.
4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Units of Measure: Report data in I-P (inch-pound) units only.
7. Include the following on the title page of each report:
a. Name of Testing, Adjusting, and Balancing Agency.
b. Address of Testing, Adjusting, and Balancing Agency.
c. Telephone number of Testing, Adjusting, and Balancing Agency.
d. Project name.
e. Project location.
f. Project Design Professional.
g. Project Engineer.
h. Project Contractor.
i. Project altitude.
j. Report date.

E. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

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 MN-1, 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. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
4. SMACNA HVAC Systems Testing, Adjusting, and Balancing.
5. Maintain at least one copy of the standard to be used at project site at all times.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:

a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.
b. NEBB, National Environmental Balancing Bureau: www.nebb.org.
c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org.

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 noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Design Professional to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.04 INSTALLATION 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. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

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. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure.

M. 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.

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. HVAC Pumps.
   2. Water Boilers.
   3. Air Cooled Refrigerant Condensers.
   4. Packaged Roof Top Heating/Cooling Units.
   5. Air Coils.
   6. Air Handling Units.
   7. Unit Ventilators.
   8. Kitchen exhaust hood supply and exhaust.
   9. Make-up air units.

10. Fans.
11. 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. 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.

C. Combustion Equipment:
1. Boiler manufacturer.
2. Model number.
3. Serial number.
4. Firing rate.
5. Overfire draft.
6. Gas meter timing dial size.
7. Gas meter time per revolution.
8. Gas pressure at meter outlet.
9. Gas flow rate.
10. Heat input.
11. Burner manifold gas pressure.
12. Percent carbon monoxide (CO).
13. Percent carbon dioxide (CO2).
14. Percent oxygen (O2).
15. Percent excess air.
16. Flue gas temperature at outlet.
17. Ambient temperature.
18. Net stack temperature.
19. Percent stack loss.
20. Percent combustion efficiency.
21. Heat output.

D. Air Cooled Condensers:
1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.
5. Serial number.

6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, design and actual.
8. Number of compressors.

E. Cooling Coils:
1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Entering air DB temperature, design and actual.
7. Entering air WB temperature, design and actual.
8. Leaving air DB temperature, design and actual.
9. Leaving air WB temperature, design and actual.
10. Water flow, design and actual.
11. Water pressure drop, design and actual.
12. Entering water temperature, design and actual.
13. Leaving water temperature, design and actual.
14. Saturated suction temperature, design and actual.
15. Air pressure drop, design and actual.

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. Duct Traverses:
1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

END OF SECTION

SECTION 23 07 13
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. New duct insulation.

B. Insulation jackets.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coating: Painting insulation jackets.

B. Section 23 05 53 - Identification for HVAC Piping and Equipment.

C. Section 23 31 00 - HVAC Ducts and Casings.

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 C553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

E. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2024a.

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

I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Samples: Submit two samples of any representative size illustrating each insulation type.

D. 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 three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of experience and approved by manufacturer.

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 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:
   1. Knauf Insulation: www.knaufusa.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Owens Corning Corp: www.owenscorning.com.
   4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum Service Temperature: 450 degrees F.
   3. Maximum Water Vapor Sorption: 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, 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.

2.03 GLASS FIBER, RIGID

A. Manufacturer:
   1. Knauf Insulation: www.knaufusa.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Owens Corning Corp: www.owenscorning.com.
   4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. 'K' value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum service temperature: 450 degrees F.
   3. Maximum Water Vapor Sorption: 5.0 percent.
   4. Maximum Density: 8.0 lb/cu ft.

2.04 JACKETS

A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
   1. Lagging Adhesive:
      a. Compatible with insulation.

B. Exterior Duct Field-Applied Jacket:
   1. Laminated Self-Adhesive Water and Weather Seals: Permanent acrylic self-adhesive system.
      a. Product: "MODEL 1577CW-W" by GTA-NHT, Inc: www.venturetape.com.
      b. Color: White.
      c. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96.
      d. Thickness: 6 mils.
      e. Adhesive Peel Strength: 55 oz/in.
      f. Tensile Strength: 68 lb/in width.
      g. Puncture Strength: 35.4 lb.
      h. Tear Strength: 8.5 lb.

2.05 DUCT LINER

A. Manufacturers:

1. Knauf Insulation: www.knaufusa.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: Incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer or acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM G 21.
   1. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
   2. Service Temperature: Up to 250 degrees F.
   3. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
   4. Minimum Noise Reduction Coefficients:
      a. 1/2 inch Thickness: 0.30.
      b. 1 inch Thickness: 0.45.
      c. 1-1/2 inches Thickness: 0.60.
      d. 2 inch Thickness: 0.70.

C. Adhesive: Waterproof, fire-retardant type.

D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before 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. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Insulated ducts conveying air above ambient temperature:
   1. Provide with or without standard vapor barrier jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with duct board and FSK jacket..

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 HVAC Duct Construction Standards - Metal and Flexible 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 air flow. Increase duct size to allow for insulation thickness.

3.03 SCHEDULES

A. Concealed Supply Air Ducts: Flexible Glass Fiber Duct Insulation.
   1. Thickness: 1-1/2 inch.

B. Return Ducts: Rigid Glass Fiber Duct Insulation Liner.
   1. Thickness: 1 inch.

C. Ducts Exposed to the Outdoors: Two (2) inches of 3 lb. density duct board with FSK Jacket, minimum R-Value of 8.7.
   1. Jacketing: VentureClad 1577CW-W (white), 6.0 mils, 5-Ply self adhesive.

D. Outside Air Intake Ducts: Flexible Glass Fiber Insulation.
   1. Thickness: 1-1/2 inch.

E. Cooking Exhaust Ducts:
   1. Grease duct: Fire wrap for zero clearance to combustibles.
   2. Grease duct: Fire wrap for zero combustible clearance. 3-M fire barrier duct wrap 615+, flexible duct wrap installed with 2 layer and staggered joints for zero clearance to combustibles. Install per manufactures requirements.

END OF SECTION

SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

C. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

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

E. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).

F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager’s General 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.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of 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/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

A. Manufacturers:
   1. Knauf Insulation: www.knaufusa.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Owens Corning Corp: www.owenscorning.com.

4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C547 and ASTM C 795; rigid molded, noncombustible.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 850 degrees F.
   3. Maximum moisture absorption: 0.2 percent by volume.

C. Insulation: ASTM C547 and ASTM C 795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 650 degrees F.
   3. Maximum moisture absorption: 0.2 percent by volume.

D. 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-inches.

E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

F. Vapor Barrier Lap Adhesive:
   1. Compatible with insulation.

G. Insulating Cement/Mastic:
   1. ASTM C195; hydraulic setting on mineral wool.

H. Fibrous Glass Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 5x5.

I. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.03 JACKETS

A. PVC Plastic.
   1. Manufacturers:
      a. Johns Manville Corporation: www.jm.com.
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.
   3. Covering Adhesive Mastic:
      a. Compatible with insulation.

2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
   1. Armacell LLC: www.armacell.us.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
   1. Minimum Service Temperature: -40 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.05 EXTERIOR REFRIGERANT PIPING INSULATION JACKET

A. Manufacturers:
   1. Airex Manufacturing, Inc: www.airexmfg.com.

B. Basis of Design: Airex Manufacturing, Inc; www.airexmfg.com.
   1. Refrigeration Pipe Insulation Protection System: Airex E-Flex Guard.

C. Insulation Protection System: Refrigerant piping insulation PVC protective cover.
   1. PVC Insulation Cover Color: White with full-length velcro fastener.
   2. Weatherization and Ultraviolet Exposure Protection: Comply with ASTM G153.
   3. Water/Vapor Permeability: Comply with ASTM E96/E96M.
   4. Anti-Fungal and Anti-Microbial Resistance: Comply with ASTM G21.
   5. Flame Spread and Smoke Development Rating of 24/450: Comply with ASTM E84 or UL723.

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 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 or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H. 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.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.
   4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

L. Exterior Applications Refrigerant piping: Provide refrigerant piping insulation jacket listed.

3.03 SCHEDULE

A. Heating Systems: Glass Fiber
   1. Heating Water Supply and Return:
      a. Pipe size up to 1-1/4” - Thickness: One-one and half (1-1/2) inch glass fiber.
      b. Pipe size 1-1/2” or larger - Thickness: Two (2) inch glass fiber.

B. Cooling Systems:
   1. Refrigerant Suction: Flexible Elastomeric Cellular
      a. Thickness: 1 inch Flexible Elastomeric Cellular
      b. Exterior: Thickness: 1/2 inch Flexible Elastomeric Cellular with jacket.
   2. Refrigerant Hot Gas:
      a. Thickness: 1 inch Flexible Elastomeric Cellular.
      b. Exterior: Thickness: 1/2 inch Flexible Elastomeric Cellular with jacket.

END OF SECTION

SECTION 23 08 00

COMMISSIONING OF HVAC

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Construction Manager's General Conditions and Division 01 Specification Sections, apply to this Section.

B. OPR, BoD, and documentation prepared by Owner and Design Professional contains requirements that apply to this Section.

1.02 SUMMARY

A. This Section includes requirements for commissioning the HVAC system and its subsystems and equipment. This Section supplements the general requirements specified in Section 01 09 13 - General Commissioning Requirements.

B. The following HVAC equipment is to be commissioned, including commissioning activities for the following specific items:
   1. High School
      a. Kitchen Exhaust Hood, Exhaust Fan, Make-up Air Unit and Hood Suppression System, and Controls.
      b. Exhaust Fans.
   2. Middle School
      a. New Control system connected to new and existing equipment.
      b. Boilers and Pumps
      c. Balancing Hydronic system connected to new boilers.
      d. Unit Ventilators.
      e. Condensing units.
      f. Rooftop Units
      g. Air Handling Unit
      h. Exhaust Fans.
   3. Floyd Elementary School
      a. New Control system connected to new and existing equipment.
      b. Unit Ventilators (new and pneumatic control replacement)
      c. Condensing units.
      d. Building pumps.
      e. Balancing Hydronic system in building.
      f. Exhaust Fan.
   4. Pine River Elementary
      a. Kitchen Exhaust Hood, Exhaust Fan, Make-up Air Unit and Hood Suppression System, and Controls.
      b. Exhaust Fans.
      c. New Control system connected to new equipment.
      d. Rooftop Units
      e. Hot water coils.
      f. Exhaust Fans.
   5. All Schools
      a. Major and minor equipment items.
      b. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

C. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.03 RELATED SECTIONS

A. Section 01 09 13 - General Commissioning Requirements: General requirements for commissioning processes that apply to this Section.

B. Section 22 08 00 - Commissioning of Plumbing: Plumbing systems commissioning requirements.

C. Section 26 08 00 - Commissioning of Electrical Systems: Electrical systems commissioning requirements.

1.04 DEFINITIONS

A. Design Professional: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. BoD: Basis of Design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. TAB: Testing, Adjusting, and Balancing.

1.05 CONTRACTOR'S RESPONSIBILITIES

A. The following responsibilities are in addition to those specified in Section 01 09 13 - General Commissioning Requirements:

B. Contractors:
   1. Perform commissioning tests at the direction of the CxA as defined in the Commissioning Plan.
   2. Attend Construction phase controls coordination meeting.
   3. Participate in HVAC systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
   4. Provide information requested by the CxA for final commissioning documentation.
   5. Provide training to Owner's personnel on system operations, preventive maintenance, sequence of operations, and function on systems.
   6. Attend TAB review & coordination meeting for TAB Work.
   7. Certify that TAB Work is complete.

C. Mechanical Contractor:
   1. Attend TAB verification testing.
   2. Provide measuring instruments and logging devices to record test data, and data acquisition equipment to record data for the complete range of testing for the required test period.

D. HVAC Instrumentation and Control Contractor; With the CxA, review control designs for compliance with the OPR and BoD, controllability with respect to actual equipment to be installed, and recommend adjustments to control designs and sequence of operation descriptions.

E. TAB Contractor:
   1. Contract Documents Review: With the CxA, review the Contract Documents before developing TAB procedures. TAB procedures will be executed per phase of construction.
      a. Verify the following:
         1) Accessibility of equipment and components required for TAB Work.
         2) Adequate number and placement of duct balancing dampers to allow proper balancing while minimizing sound levels in occupied spaces.
         3) Adequate number and placement of balancing valves to allow proper balancing and recording of water flow.
         4) Adequate number and placement of test ports and test instrumentation to allow reading and compilation of system and equipment performance data needed to conduct both TAB and commissioning testing.
         5) Air and water flow rates have been specified and compared to central equipment output capacities.
      b. Identify discontinuities and omissions in the Contract Documents.

c. This review of the Contract Documents by the TAB Subcontractor satisfies requirements for a design review report as specified in Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
d. Additional Responsibilities: Participate in tests specified in Section 23 09 01 - Building Management and Control System.

F. Electrical Contractor:
1. With the Mechanical Contractor; coordinate installations and connections between and among electrical and HVAC systems, subsystems, and equipment.

1.06 COMMISSIONING DOCUMENTATION

A. The following submittals are in addition to those specified in Section 01 09 13 - General Commissioning Requirements.

B. Provide the following information to the CxA for purpose of updating the final commissioning report:
1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC systems, assemblies, equipment and components to be verified and tested.
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that HVAC systems, subsystems equipment and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

C. Test Checklists: CxA shall develop test checklists for HVAC systems, subsystems, and equipment, including interfaces and interlocks with other systems. CxA shall prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Contractors shall complete test checklists. In addition to the requirements specified in Section 01 09 13 - General Commissioning Requirements, checklists shall include, but not be limited to, the following:
1. Equipment Checklists:
a. Mechanical Contractor to complete equipment checklists for all equipment assigned to the contractor by the CxA
b. Complete checklists according to the order and timing outlined in the commissioning plan.
1) Checklists completion begins when equipment arrives on site
2) Checklists continue as equipment is being installed
3) Checklists are completed when startup verification has been completed
2. Construction Phase Issues Log
a. Issues assigned to the contractor by the CxA shall be addressed/acknowledged by the responsible contractor.
b. Construction phase issues must be resolved prior to the completion of construction phase.

D. Testing:
1. Calibration of sensors and sensor function.
2. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
3. Control sequences for HVAC systems.
4. Sequence of response(s) to control signals at specified conditions.
5. Expected performance of systems, subsystems, and equipment at each step of test.
6. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
7. Interaction of auxiliary equipment.
8. Issues log.

1.07 SUBMITTALS

A. The following submittals are in addition to those specified in Section 01 09 13 - General Commissioning Requirements:
   1. Testing Procedures: CxA shall submit detailed testing plan, procedures, and checklists for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.
   2. Certificate of Readiness: CxA shall compile certificates of readiness from Contractor certifying that systems, subsystems, equipment, and associated controls are ready for testing.
   3. Certificate of Completion of Installation, Prestart, and Startup: CxA shall certify that installation, prestart, and startup activities have been completed.
   4. Certified Pipe Cleaning and Flushing Report: Contractors shall certify that pipe cleaning, flushing, hydrostatic testing, and chemical treating have been completed. CxA shall Verify reports.
   5. Test and Inspection Reports: Contractors shall provide completed Test and Inspection Reports. CxA shall compile and submit test and inspection reports and certificates and shall include them in systems manual and commissioning report.
   6. Corrective Action Documents: Contractors shall provide documentation that corrective action, when required, has been completed. CxA shall review and approved corrective action documents.
   7. Certified TAB Reports: Contractor shall provide certified TAB reports, the CxA shall review and comment on certified TAB reports and include in final Commissioning Report.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 TESTING PREPARATION

A. Prerequisites for Testing (Completed by Contractor):
   1. Coordinate phased construction work to comply with commissioning requirements.
   2. Certify that HVAC systems, subsystems, and equipment have been completed, calibrated, and started; are operating according to the OPR, BoD, and Contract Documents; and that Certificates of Readiness are signed and submitted.
   3. Certify that HVAC instrumentation and control systems have been completed and calibrated; are operating according to the OPR, BoD, and Contract Documents; and that pretest set points have been recorded.
   4. Certify that TAB procedures have been completed, and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.
   5. Test systems and intersystem performance after approval of test checklists for systems, subsystems, and equipment.
   6. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shut down, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
   7. Verify each operating cycle after it has been running for a specified period and is operating in a steady-state condition.
   8. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable, or failed. Repeat this test for each operating cycle that applies to system being tested.
   9. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
   10. Annotate checklist or data sheet when a deficiency is observed.
   11. Verify equipment interface with monitoring and control system and TAB criteria; include the following:
      a. Supply and return flow rates for VAV and constant volume systems in each operational mode.
      b. Operation of terminal units in both heating and cooling cycles.
      c. Minimum outdoor-air intake in each operational mode and at minimum and maximum airflows.
      d. Building pressurization.
      e. Total exhaust airflow and total outdoor-air intake.
      f. Operation of indoor-air-quality monitoring systems.
   12. Verify proper responses of monitoring and control system controllers and sensors to include the following:

a. For each controller or sensor, record the indicated monitoring and control system reading and the test instrument reading. If initial test indicates that the test reading is outside of the control range of the installed device, check calibration of the installed device and adjust as required. Retest malfunctioning devices and record results on checklist or data sheet.
b. Report deficiencies and prepare an issues log entry.

13. Verify that HVAC equipment field quality-control testing has been completed and approved. CxA shall direct, witness, and document field quality-control tests, inspections, and startup specified in individual Division 23 Sections.

B. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation. For individual room cooling tests, provide temporary heaters to impose a cooling load indicated in BoD. Operational modes include the following:
1. Occupied and unoccupied.
2. Warm up and cool down.
3. Life-safety and safety systems.
4. Partial occupancy conditions.

3.02 TAB VERIFICATION

A. Prior to performance of testing and balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. TAB Contractor shall coordinate with CxA for work required in Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC. TAB Contractor shall copy CxA with required reports, sample forms, checklists, and certificates.

C. Contractor, HVAC Contractor and CxA shall witness TAB Work.

D. TAB Preparation:
1. TAB Contractor shall provide CxA with data required for "Pre-Field TAB Engineering Reports" specified in Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
a. CxA shall use this data to certify that prestart and startup activities have been completed for systems, subsystems, and equipment installation.

E. Ductwork Air Leakage Testing:
1. Design Professional will identify, for HVAC Contractor and CxA, portions of duct systems to have ductwork air leakage testing. Ductwork air leakage testing shall be performed according to Section 23 31 00 - HVAC Ducts and Casings, and A SAMPLE SHALL BE witnessed by the CxA.

F. Verification of Final TAB Report:
1. Provide technicians, instrumentation, and tools to verify testing & balancing of HVAC & Plumbing systems at the direction of CxA.
2. CxA shall select up to 50 percent of report for field verification.
3. CxA shall notify TAB Contractor 10 days in advance of the date of field verification; however, notice shall not include data points to be verified. The TAB Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
4. Failure of an item is defined as follows:
a. For all readings other than sound, a deviation of more than 10 percent.
1) For sound pressure readings, a deviation of 3 dB. (Note: Variations in background noise must be considered.)
b. Failure of more than 10 percent of selected items shall result in rejection of final TAB report.

G. If deficiencies are identified during verification testing, CxA shall notify the TAB Contractor, Construction Manager and Architect, and shall take action to remedy the deficiency. Design Professional shall review final tabulated checklists and data sheets to determine if verification is complete and that system is operating according to the Contract Documents.

H. CxA shall certify that TAB Work has been successfully completed.

3.03 TESTING

A. Test systems and intersystem performance after test checklists for systems, subsystems, and equipment have been approved.

B. Perform tests using design conditions whenever possible.
   1. Simulate conditions by imposing an artificial load when it is not practical to test under design conditions and when written approval for simulated conditions is received from CxA. Before simulating conditions, calibrate testing instruments. Set and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
   2. Alter set points when simulating conditions is not practical and when directed by CxA.
   3. Alter sensor values with a signal generator when design or simulating conditions and altering set points are not practical. Do not use sensor to act as signal generator to simulate conditions or override values.

C. Scope of HVAC Contractor Testing:
   1. Testing scope shall include new HVAC installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. It shall include measuring capacities and effectiveness of operational and control functions.
   2. Test all operating modes, interlocks, control responses, responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. Detailed Testing Procedures: CxA, with HVAC Contractor, TAB Contractor, and HVAC Instrumentation and Control Contractor, shall prepare detailed testing plans, procedures, and checklists for HVAC systems, subsystems, and equipment.

E. HVAC Instrumentation and Control System Testing:
   1. Field testing plans and testing requirements are specified in Division 23 Sections "Building Management system" with Sequence of Operations. The CxA, HVAC Contractor, and the HVAC Instrumentation and Control Contractor shall collaborate to prepare testing plans.
   2. CxA shall convene a meeting of appropriate entities to review test report of HVAC instrumentation and control systems.

F. Pipe cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 Piping Sections. HVAC Contractor shall prepare pipe system cleaning, flushing, and hydrostatic testing as required. CxA shall review and comment on plan and final reports. CxA shall certify that pipe cleaning, flushing, hydrostatic tests, and chemical treatment, as required, have been completed. Plan shall include the following:
   1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed Drawings for each pipe sector showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
   2. Description of equipment for flushing operations.
   3. Minimum flushing water velocity.
   4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

G. HVAC Distribution System Testing: HVAC Contractor shall prepare a testing plan to verify performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems. Include HVAC terminal equipment and unitary equipment. Plan shall include the following:
   1. Sequence of testing and testing procedures for each item of equipment and section of pipe to be tested, identified by identification marker. Markers shall be keyed to Drawings showing the physical location of each item of equipment and pipe test section. Drawings shall be formatted to allow each item of equipment and section of piping to be physically located and identified when referred to in the system testing plan.
   2. Tracking checklist for managing and ensuring that all pipe sections have been tested.

H. Deferred Testing:
   1. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, the deficiency shall be documented and reported to Owner. Deficiencies shall be resolved and corrected by appropriate parties and test rescheduled.

2. If the testing plan indicates specific seasonal testing, appropriate initial performance tests shall be completed and documented and additional tests scheduled.

END OF SECTION

SECTION 23 09 01

BUILDING MANAGEMENT AND CONTROL SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building Management and Control System.

1.02 RELATED SECTIONS

A. Section 20 00 00 - Basic Mechanical Requirements.

B. Section 23 21 23 - Hydronic Pumps.

C. Section 23 23 00 - Refrigerant Piping.

D. Section 23 31 00 - HVAC Ducts and Casings.

E. Section 23 34 23 - HVAC Power Ventilators.

F. Section 23 52 16 - Condensing Boilers.

G. Section 23 62 13 - Packaged Air-Cooled Refrigerant Compressor and Condenser Units.

H. Section 23 73 13 - Modular Central-Station Air handling Units.

I. Section 23 74 13 - Packaged Outdoor Central-Station Air-Handling Units.

J. Section 23 74 14 - Packaged Outdoor Central Air Handling Units (RTU-3).

K. Section 23 81 01 - Terminal Heat Transfer Units

L. Division 26 - Electrical.

1.03 EXISTING BUILDING MANAGEMENT AND CONTROL SYSTEM

A. The temperature control system shall be an extension of the existing district-wide Honeywell Building Management and Control System control network, and shall be integrated directly into the existing Honeywell Graphical User Interface software and computer located at the maintenance office.

1.04 WORK INCLUDED

A. Temperature Control Contractor (TCC) shall furnish all labor, materials and equipment necessary for a complete and operating Building Management and Control System (BMCS) incorporating Direct Digital Control (DDC), equipment monitoring, and control through an existing PC based Operator Work Station (OWS) with color graphical displays (GUI); microcomputer based General Purpose Controllers (GPC's) interfacing directly with sensors, actuators and environmental delivery systems (i.e. HVAC units, fan coils, boilers, and chillers); pneumatic and electric controls and mechanical devices for all items indicated on drawings described herein including dampers, valves, panels, and compressed air plant; a primary communication network to allow data exchange from GPC to GPC, interfacing with sensors, actuators, and terminal equipment control devices.

B. BMCS control capabilities shall include time-of-day control, monitoring, optimum start/stop, temperature control, after-hours overrides, and reporting and trending.

C. Communication to the BMCS control system shall be an extension of the existing Honeywell Communication Bus allowing communication of new controllers to Existing Honeywell XBS GUI..

D. The TCC shall completely check out, calibrate and test all connected hardware and software to insure that the system performs in accordance with approved specifications and operating sequences. The TCC shall verify with the Owner's representative the correct operation of each unit, and shall provide a copy of the documentation used during the commissioning of the system.

E. During system commissioning the TCC shall provide a minimum of 8 hours on-site operator instruction to the Owner's maintenance personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories. Operator training shall be completed prior to final acceptance of the BMCS by the Owner.

1.05 WORK BY OTHERS

A. Access doors and setting in place of valves, flow meters, water pressure and differential taps, flow switches, thermal wells, dampers, airflow stations, and current transformers.

B. The Roof Top Unit (RTU), Air Handling Unit (AHU), and Unit Ventilator (UV) manufacturer shall furnish and completely install, including factory wiring, the following controls and equipment with each unit: dampers; gas valves; internal safety controls; relays; variable speed drives (if applicable); and low ambient lockout control. The RTU manufacturer shall provide and completely install a terminal strip with each RTU for connection to a Honeywell controller, for control of supply, return and exhaust air fans; variable speed drives; heating and cooling stages, and damper actuators.

C. Division 26 contractor shall furnish the necessary materials and install 110-volt power to each control panel. Power shall be brought into control enclosure and connected to controller power module.

1.06 MANUFACTURER

A. Honeywell International Inc., Manufacturers' - Saginaw Branch office only.

1.07 SUBMITTALS

A. Four copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers catalog data sheets and installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams, software descriptions, calculations, and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings. A complete written Sequence of Operation as well as a hard copy graphical depiction of the application control programs shall also be included with the submittal package.

B. Submittal shall also include a trunk cable schematic diagram depicting the Graphical User Interface (GUI) computer, control panel locations and a description of the communication type, media and protocol.

C. Submittal shall also include a complete point list of all connected points to the DDC system.

D. Upon completion of the work, BMCS contractor shall provide a complete set of 'as-built' drawings and application software on magnetic floppy disk media or compact disk. Drawings shall be provided as AutoCAD™ or Visio™ compatible files. Eight copies of the 'as-built' drawings shall be provided in addition to the documents on magnetic floppy disk media or compact disk.

E. Product Data: Data entry, electrical installation, programming, start up, test and validation acceptance documentation, and system warranty.

F. Operation and Maintenance Manuals: Shall contain the following:
   1. Operators Manual shall be provided with graphical explanations of keyboard use for all operator functions specified under Operator Training.
   2. Computerized printouts of all direct digital controllers data file including all point processing assignments, physical terminal relationship, scales and offsets, command and alarm limits, etc.
   3. A manual shall be provided including revised as-built documents of all materials required of this specification.

1.08 AGENCY AND CODE APPROVALS

A. All products of the BMCS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided with the submittal package. Systems or products not currently offering the following approvals are not acceptable.
   1. UL-916; Energy Management Systems
   2. ULC; UL - Canadian Standards Association
   3. FCC, Part 15, Subpart J, Class A Computing Devices

1.09 SOFTWARE LICENSE AGREEMENT

A. The Owner shall sign a copy of the BMCS manufacturer's standard software and firmware licensing agreement as a condition of this contract. Such license shall grant use of all programs and application software to Owner as defined by the manufacturer's license agreement, but shall protect manufacturer's rights to disclosure of trade secrets contained within such software.

1.10 DELIVERY, STORAGE AND HANDLING

A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.11 JOB CONDITIONS

A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to ensure that the Work will be carried out in an orderly fashion. It shall be this Contractor's responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers, and structural and architectural features.

1.12 WARRANTY

A. Provide Contractor's one year material and workmanship warranty in accordance with General Requirements, Division 1; include all components, system software, and parts; labor to repair, reprogram or replace components.

B. All corrective software modifications made during warranty period shall be updated on all user documentation, on user and manufacturer's archived software disks.

1.13 QUALITY ASSURANCE

A. Complete BMCS installation shall be in strict compliance to national, state and local mechanical and electric codes and electrical section of these specifications. All devices shall be UL or FM listed and labeled for specific use, application and environment to which they are applied.

PART 2 MATERIALS

2.01 BMCS SOFTWARE

A. Honeywell International shall provide voluntary alternate to upgrade Existing Honeywell XBS GUI to Honeywell EBI GUI.

2.02 GENERAL PURPOSE CONTROLLERS

A. General Purpose Controllers (GPC's) shall be stand-alone custom programmable EEPROM based configured to perform the sequences specified, and with Input/Output (I/O) selected for the application. All GPC's shall use Honeywell communications network application protocol for field bus and be directly connected to the existing control network. GPC's shall comply with FCC rules and be tested and listed under UL864 and UL916 for computing devices, and plenum rated for air handling compartments. GPC enclosures shall be metal, suitable for the environment in which they are located. Each controller shall be designed with on-board jacks for quick commissioning and troubleshooting with a portable programming tool.

2.03 APPLICATION SPECIFIC CONTROLLERS

A. Application Specific Controllers (ASC's) shall be configurable to perform the sequences specified, with sufficient I/O capacity selected for the application. All ASC's shall be LonMark certified and shall be fully compliant with the associated LonMark HVAC profile. All ASC’s shall communicate via the existing Honeywell control network.

2.04 CONTROLLER POWER MODULES

A. Power modules shall meet all standards necessary to pass UL864, UL916, and NFPA92A requirements, as well as Honeywell’s transient and surge tests. Power modules shall include line bypass capacitors, metal oxide varistors, and meet UL “power limiting” requirements.

2.05 SENSORS

A. Temperature sensors shall be Resistance Temperature Detector (RTD) type of 100, 1,000, or 3,000 ohm platinum, 500 ohm Balco, or 20,000 ohm. Sensors shall have + or - 1.0 degrees F accuracy between 32 degrees and 212 degrees.
   1. Wall mounted room temperature sensors shall be provided where shown on the plans and shall be mounted 48" above finished floor.
   2. Wall mounted room temperature sensors shall include the following features: Network jack to access control buss.
   3. Wall mounted room temperature sensors located in gymnasium and cafeteria shall have lockable, clear plastic guard installed over sensor.
   4. Wall mounted room temperature sensor for RTU 1 (Main Office) shall include the following features: Occupied/unoccupied override button with LED indicator; network jack for connection to control buss.
   5. Plastic used on subbase or housing shall be UL94-5V rated.

a. Duct temperature sensors shall be rigid stem or averaging type as specified in the sequence of operation.
b. Current sensing relays used for proof-of-loading for supply and return air fans, RTU compressors, water circulation pumps shall be Veris model H-904. Each relay shall be provided with an LED to allow ready observation of the relay status.
c. Current sensing relays used for proof-of-loading for exhaust air fans shall be H-800. Each relay shall be provided with an LED to allow ready observation of the relay status.
d. Current sensing relays used for proof-of-loading heating or chilled water pumps shall be suitable for 2 to 200 amperes and shall have adjustable trip thresholds of plus or minus two percent of range.

2.06 VALVES

A. Gas valves for RTU's shall be furnished and factory installed by the equipment manufacturer.

B. All heating and chilled water control valves shall be furnished by the BMCS Contractor and shall be installed by the Mechanical Contractor.

C. Automatic control valves 2.0 inches and smaller shall be screwed type, bronze body, carbon-filled seat, stainless steel stem, with carbon-filled Teflon® packing and EPDM o-ring.

D. Automatic control valves 2.5 inches and larger shall be flanged.

E. Valves shall be ANSI-rated to withstand pressures and temperatures encountered. Valves shall have stainless steel stems and spring loaded Teflon® packing with replaceable discs.

F. All modulating straight-through water valves shall be provided with equal-percentage contoured throttling plugs. All three-way valves shall be provided with linear throttling plugs such that total flow through valve shall remain constant regardless of valve's position. Valves shall be sized for a pressure drop equal to coil they serve but not to exceed 5 psi.

2.07 ACTUATORS

A. For all automatically controlled devices the BMCS contractor shall provide actuators sized to operate the appropriate loads with sufficient reserve power to provide smooth modulating action and tight closeoff. Actuators shall be provided with suitable corrosion resistant linkages for valves or dampers. Except as specified herein, all actuators shall be sized for load and close off encountered in strict accordance with manufacturer recommendations.

B. Actuators for heating valves 1” and less shall be direct coupled electronic.

C. Actuators for heating and chilled water valves shall be direct digital control floating or proportionally controlled. Actuators for Primary equipment such as Air Handling Units, Make Up Air Units, etc shall Spring Return upon power failure to safe position. Actuators for secondary equipment such as variable air volume boxes, fan coil units, etc may not be spring return.

D. Actuators for dampers shall be direct digital control floating or proportionally controlled. Actuators for Primary equipment such as Air Handling Units, Make Up Air Units, etc shall Spring Return upon power failure to safe position. Actuators for secondary equipment such as variable air volume boxes, fan coil units, etc may not be spring return.

2.08 AUTOMATIC CONTROL DAMPERS

A. Dampers for RTU's shall be furnished and factory installed by the equipment manufacturer. Equipment Manufacturer to furnish and install damper linkage between return air damper and outside air damper.

B. Frames shall not be less than 13-gauge galvanized steel. Blades shall not be over 8 inches wide nor less than 16-gauge galvanized steel roll formed. Bearings shall be oilite, ball-bearing or nylon with steel shafts. Side seals shall be stainless steel of the tight-seal spring type. Dampers and seals shall be suitable for temperature ranges of -40 to 200F.
1. All proportional control dampers shall be opposed or parallel blade type as hereinafter specified and all two-position dampers shall be parallel blade types.
2. Dampers shall be sized to meet flow requirements of the application. The sheet metal contractor shall furnish and install baffles to fit the damper to duct size. Baffles shall not exceed 6".
3. Dampers shall be minimum leakage type to conserve energy and the temperature control manufacturer shall submit leakage data for all control dampers with the temperature control submittal.

Maximum leakage for dampers in excess of sixteen inches square shall be 30 CFM per square foot at static pressure of 1 inch of WC.

a. Where ultra-low leakage dampers are specified the blade edges shall be fitted with replaceable, snap-on, inflatable seals to limit damper leakage to 6 CFM per square foot for dampers in excess of sixteen inches square at 1 inch of WC.

2.09 MISCELLANEOUS MATERIALS

A. All material not identified in this Specification that is required for a complete and operating temperature control system is the responsibility of the TCC.

2.10 COMBINATION FIRE AND SMOKE DAMPERS

A. Refer to drawings. **NOT** provided by TCC.

2.11 SMOKE DETECTORS

A. Furnished, installed and wired by Division 26 Contractor. **NOT** provided by TCC.

PART 3 EXECUTION:

3.01 PNEUMATIC CONTROLS (IF APPLICABLE)

A. All pneumatic equipment and connecting piping shall be installed in a neat and workmanlike manner. Non-metallic tubing may be used and shall be virgin polyethylene, meeting stress-crack test ASTM D1693-60T. Tubing shall be self-extinguishing under ASTM-D635 flammability test. Where exposed, this tubing shall be run within adequately supported rigid metallic raceway, electrical tubing or duct, or in multitube bundles. Properly supported hard copper tubing with solder joints and tool-made bends may be used, and shall be provided with 12" flexible polyethylene connections at valves or dampers. Pneumatic lines serving smoke dampers shall in all cases be copper or aluminum. Smoke damper lines concealed above ceilings may be properly supported soft copper.

3.02 CONTROL WIRING

A. All wiring and tubing shall be properly supported and run in a neat and workmanlike manner.

B. All wiring and tubing exposed and in equipment rooms shall run parallel to or at right angles to the building structure.

C. All piping and wiring within enclosures shall be neatly bundled and anchored to prevent obstruction to devices and terminals.

D. All wiring shall be in accordance with all local and national codes. All line voltage wiring, all wiring exposed, and all wiring in equipment rooms shall be installed in conduit in accordance to the electrical specifications.

E. All electronic wiring shall be #18 AWG minimum THHN and shielded if required, except standard network (Ethernet, LonWorks, etc.) cabling shall be as tested and recommended in lieu of #18 gauge twisted, #22 or #24 gauge is acceptable if used as a part of an engineered structured cabling system.

F. The control manufacturer must submit technical and application documentation demonstrating that this cabling system has been tested and approved for use by the manufacturer of both the control system and the engineered structured cabling system.

G. All wiring for heating plant, chilled water plant, mechanical and electrical control panels shall be concealed in an approved manner.

H. TCC shall install and connect sensors for boiler manufacturers sequencing panel.

3.03 CO & NO2 MONITORING PANEL

A. CO & NO2 Monitoring Panel shall be based upon Macurco DVP-120

B. The system shall use CM-2B or CM-3 Carbon Monoxide (CO) to current transducers

C. The system shall use NB-2 Nitrogen Dioxide (NO2) to current transducers

D. Number of Required Transducers will be in accordance with manufacturers' recommendations for square foot coverage.

E. DVP-120 Control Panel shall provide three relays which can be used for ventilation fan control or alarm signaling, relays (SPDT-Form C) are for pilot duty only, capable of switching 10 amp loads up to 240 VAC.

F. Division 26 Contractor shall furnish necessary materials and install 110-volt power to each monitoring panel. Power shall be brought into control enclosure and connected to controller power module as indicated on TCC drawings.

3.04 CONTROLLER POWER SUPPLY

A. Division 26 Contractor shall furnish necessary materials and install 110-volt power to each control panel. Power shall be brought into control enclosure and connected to controller power module as indicated on TCC drawings.

PART 4 SEQUENCE OF OPERATIONS

4.01 SEE SECTION 23 09 01 CONTROL SEQUENCES

A.

END OF SECTION

SECTION 23 09 02

CONTROL SEQUENCES

PART 1 GENERAL

1.01 GENERAL

A. The Following is the sequence of operations for the Building Management System specified in Section 23 09 00.

1.02 SEQUENCE OF OPERATIONS

A. Middle School:
   1. System to be controlled:
      a. Hot Water Heating System Control.
      b. Unit Ventilator Control.
      c. AHU-A1 (Dx cooling) Control.
      d. AHU-(E) Control. (Face and Bypass) (exhaust fan interlocked)
      e. RTU-1 (heating coil) Control.
      f. RTU-2 and 3 gas fired Control.
      g. Exhaust Fans Control.
      h. Finned Tube Radiation (FT) - BAS Control.

B. High School:
   1. System to be controlled:
      a. Exhaust Fans Control.

C. Pine River Elementary School:
   1. System to be controlled:
      a. RTU-1 and 2 (heating coil) Control.
      b. Exhaust Fans Control.

D. Floyd Elementary School:
   1. System to be controlled:
      a. Unit Ventilator Control.
      b. Blower Coil (E) Control.
      c. AHU-(E) Control.
      d. Exhaust Fans Control.

1.03 MIDDLE SCHOOL

A. Hot Water Heating System Control:
   1. System:
      a. Hot water circulating pumps shall start and boilers enabled when outdoor air temperature drops to 58 degrees F and shall stop and boilers disabled when outdoor temperature rises to 62 degrees F.
      b. Circulating pumps (P-1 and P-2) shall be controlled in staged manner such that lead pump runs continuously with second pump to stage on during additional drop in differential pressure. Upon lead pump failure, lag pump start and a pump failure alarm shall be generated. Lead pump alteration shall take place on a monthly basis during off hours.
      c. A boiler control panel, furnished with boiler, shall control all functions of boiler(s) operation. System shall deliver a supply water temperature of 180 degrees F to building heating system.
      d. Boiler pump command shall be interlocked with boiler controls.
      e. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system as listed below.
   2. Each boiler shall run subject to its own internal safeties and controls. On failure of any boiler, the failed boiler shall be "removed" from operation and the next available piece of equipment as defined by the user shall be staged on in its place.
   3. Hot Water Supply Temperature Setpoint Reset:
      a. The hot water supply temperature setpoint shall reset based on outside air temperature.

Outside Air Temp	Hot Water Supply Temp
10°F	190°F
55°F	100°F

b. Alarms shall be provided as follows:
   1) Boiler 1 Failure: General Alarm.
   2) Boiler 2 Failure: General Alarm.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Outside Air Temp	x								x		x
Outside Air Humidity	x								x		x
Main Hot Water Return Temp	x								x		x
Main Hot Water Supply Temp	x								x		x
Hot Water Supply Temp OA Reset		x							x		x
Boiler Emergency Shutdown Status			x						x		x
System Enable				x					x		x
Hot Water Pump 1 Start/Stop				x					x		x
Hot Water Pump 2 Start/Stop				x					x		x
Boiler 1 Failure									X	x	x
Boiler 2 Failure									X	x	x
High Main Hot Water Supply Temp									X	x	x
Low Main Hot Water Supply Temp									X	x	x
Totals	3	1	3	3	0	0	0	0	17	7	17

B. Unit Ventilator Control:
   1. System:
      a. Occupied / unoccupied changeover shall be programmed. Provide a 3-hour unoccupied override pushbuttons, at space sensors, to cause units to operate in occupied cycle when depressed.
      b. Low temperature protection thermostats, located on leaving face of heating coils, shall stop unit fans sensing low coil discharge air temperatures.
      c. Heating or cooling mode of operation shall be controlled by outdoor air temperature and chiller operation. Units shall operate in heating mode when outdoor air temperature drops to 60 degrees F and will shift to cooling mode when outdoor air temperature rises to 65 degrees F and chiller is in operation.
   2. Heating-Occupied Cycle:
      a. Unit fans shall operate continuously. Cooling coil end of cycle isolation valves shall be closed and heating coil and of cycle isolation valves shall be open. A call for full heat shall occur when space temperature is less than 2 degrees F. below temperature setting on space temperature sensor. At this time outdoor, exhaust, and return air dampers shall be in 100 percent return air

position. As space temperatures continue to rise, outdoor and return air mixing dampers reposition to minimum outdoor air positions. On a continued rise in space temperature, toward space temperature settings economizer shall modulate to satisfy space temperature. A low limit discharge air sensor shall override control of dampers to prevent discharge air temperature from dropping below 65 degrees F.

b. On a drop in space temperature, reverse shall occur.

3. Heating-Unoccupied Cycle:
   a. Units shall be cycled on and off, at 100 percent return air and full heat, to maintain reduced space temperatures.
   b. Provide and optimized warm-up cycle to start units at 100 percent return air and occupied space temperature settings, to provide space target temperatures at scheduled occupancy.
4. Cooling-Occupied Cycle: Unit fans shall operate continuously and outdoor and return air mixing dampers shall be at their minimum positions. Space sensors shall control economizer to maintain their space temperature settings.
   a. Cooling Stage:
      The controller shall measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, the stage shall have a 5 minute (adj.) minimum runtime.
   b. The cooling shall be enabled whenever:
      1) Outside air temperature is greater than 60°F (adj.).
      2) AND the zone temperature is above cooling setpoint.
      3) AND the fan is on.
   c. Cooling-Unoccupied Cycle:
      1) Units shall be off and remain inoperable.
      2) Provide an optimized start program to bring units on, prior to occupancy, at occupied space temperatures settings to achieve space target temperatures at scheduled occupancy.
5. Supply Air Temperature Setpoint - Optimized:
   The controller shall monitor the supply air temperature and shall maintain a supply air temperature setpoint reset based on zone cooling and heating requirements
6. The supply air temperature setpoint shall be reset for cooling based on zone cooling requirements as follows:
   a. The initial supply air temperature setpoint shall be 55°F (adj.).
   b. As cooling demand increases, the setpoint shall incrementally reset down to a minimum of 53°F (adj.).
   c. As cooling demand decreases, the setpoint shall incrementally reset up to a maximum of 72°F (adj.).
7. If more zones need heating than cooling, then the supply air temperature setpoint shall be reset for heating as follows:
   a. The initial supply air temperature setpoint shall be 82°F (adj.).
   b. As heating demand increases, the setpoint shall incrementally reset up to a maximum of 85°F (adj.).
   c. As heating demand decreases, the setpoint shall incrementally reset down to a minimum of 72°F (adj.).
8. Supply Air Temperature:
   a. The controller shall monitor the supply air temperature.
   b. Alarms shall be provided as follows:
      1) High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
      2) Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.)
   c. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system alarms shall be provided as follows:
      1) High Zone Carbon Dioxide Concentration: If the zone CO_2 concentration is greater than 1000ppm (adj.) when in the occupied mode.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Discharge Air Temp	x								x		x
Zone Carbon Dioxide PPM	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Face and Bypass Dampers		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Fan Status			x						x		x
Freezestat			x						x	x	x
Zone Override			x						x		x
Cooling Stage 1				x					x		x
Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Heating Setpoint					x				x		x
Zone Carbon Dioxide PPM Setpoint					x				x		x
Economizer Disable Setpoint					x				x		x
Schedule								x		x	x
Fan Failure										x	x
High Zone Carbon Dioxide Concentration										x	x
Low Zone Temp										x	x
Totals	**4**	**3**	**3**	**2**	**4**	**0**	**0**	**1**	**15**	**5**	**19**

Total Hardware (12) **Total Software (25)**

C. AHU-1 Controls:
   1. Run Conditions - Scheduled:
      a. The unit shall run according to a user definable time schedule in the following modes:
         1) Occupied Mode: The unit shall maintain:
            (a) A 75°F (adj.) cooling setpoint
            (b) A 70°F (adj.) heating setpoint.
         2) Unoccupied Mode (night setback): The unit shall maintain:
            (a) A 85°F (adj.) cooling setpoint.
            (b) A 55°F (adj.) heating setpoint.
   2. Alarms shall be provided as follows:
      a. High Zone Temp:
         1) If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
      b. Low Zone Temp:
         1) If the zone temperature is less than the heating setpoint by a user definable amount (adj.).

3. Zone Setpoint Adjust:
    a. The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
4. Zone Optimal Start:
    a. The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
5. Zone Unoccupied Override:
    a. A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
6. Freeze Protection:
    a. The unit shall shut down and generate an alarm upon receiving a freezestat status.
7. Supply Air Smoke Detection:
    a. The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.
8. Supply Fan:
    a. The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
    b. Alarms shall be provided as follows:
        1) Supply Fan Failure: Commanded on, but the status is off.
        2) Supply Fan in Hand: Commanded off, but the status is on.
        3) Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).
    c. Cooling-Occupied Cycle: Unit fans shall operate continuously and outdoor and return air mixing dampers shall be at their minimum positions. Space sensors shall control economizer to maintain their space temperature settings.
9. Cooling Stage:
    The controller shall measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, the stage shall have a 5 minute (adj.) minimum runtime.
    a. The cooling shall be enabled whenever:
        1) Outside air temperature is greater than 60°F (adj.).
        2) AND the zone temperature is above cooling setpoint.
        3) AND the fan is on.
    b. Cooling-Unoccupied Cycle:
        1) Units shall be off and remain inoperable.
        2) Provide an optimized start program to bring units on, prior to occupancy, at occupied space temperatures settings to achieve space target temperatures at scheduled occupancy.
10. Heating Coil Valve:
    a. The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint.
    b. The heating shall be enabled whenever:
        1) Outside air temperature is less than 65°F (adj.).
        2) AND the zone temperature is below heating setpoint.
        3) AND the supply fan status is on.
        4) AND the cooling is not active.
    c. The heating coil valve shall open whenever the freezestat (if present) is on.
11. Economizer:
    a. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 2°F less than the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
    b. The economizer shall be enabled whenever:
        1) Outside air temperature is less than 65°F (adj.).
        2) AND the outside air temperature is less than the return air temperature.
        3) AND the supply fan status is on.

c. The economizer shall close whenever:
    1) Mixed air temperature drops from 45°F to 40°F (adj.).
    2) OR on loss of supply fan status.
    3) OR the freezestat (if present) is on.
d. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.

12. Minimum Outside Air Ventilation - Fixed Percentage:
    a. The outside air dampers shall maintain a minimum position (adj.) during building occupied hours and be closed during unoccupied hours.
13. Mixed Air Temperature:
    a. The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
    b. Alarms shall be provided as follows:
        1) High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
        2) Low Mixed Air Temp: If the mixed air temperature is less than 45°F (adj.).
14. Return Air Temperature:
    a. The controller shall monitor the return air temperature and use as required for economizer control (if present).
    b. Alarms shall be provided as follows:
        1) High Return Air Temp: If the return air temperature is greater than 90°F (adj.).
        2) Low Return Air Temp: If the return air temperature is less than 45°F (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Cooling Valve		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Freezestat			x						x	x	x
Return Fan Status			x						x		x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Zone Override			x						x		x
Return Fan Start/Stop				x					x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			
High Mixed Air Temp										x	
High Return Air Temp										x	
High Zone Temp										x	

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Low Mixed Air Temp										x	
Low Return Air Temp										x	
Low Zone Temp										x	
Return Fan Failure										x	
Return Fan in Hand										x	
Return Fan Runtime Exceeded										x	
Supply Fan Failure										x	
Supply Fan in Hand										x	
Supply Fan Runtime Exceeded										x	
Totals	**4**	**3**	**5**	**2**	**3**	**0**	**0**	**1**	**16**	**14**	**17**

Total Hardware (14) **Total Software (34)**

D. AHU-(E) Controls:
   1. Run Conditions - Scheduled:
      a. The unit shall run according to a user definable time schedule in the following modes:
         1) Occupied Mode: The unit shall maintain
            (a) A na°F (adj.) cooling setpoint
            (b) A 70°F (adj.) heating setpoint.
         2) Unoccupied Mode (night setback): The unit shall maintain
            (a) A na°F (adj.) cooling setpoint.
            (b) A 55°F (adj.) heating setpoint.
      b. Alarms shall be provided as follows:
         1) High Zone Temp:
            (a) If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
         2) Low Zone Temp:
            (b) If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
   2. Zone Setpoint Adjust:
      a. The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
   3. Zone Optimal Start:
      a. The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
   4. Zone Unoccupied Override:
      a. A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
   5. Freeze Protection:
      a. The unit shall shut down and generate an alarm upon receiving a freezestat status.
   6. Supply Air Smoke Detection:
      a. The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.
   7. Supply Fan:
      a. The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
      b. Alarms shall be provided as follows:

1) Supply Fan Failure: Commanded on, but the status is off.
2) Supply Fan in Hand: Commanded off, but the status is on.
3) Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).

8. Face and Bypass Dampers Control:
   a. The unit shall maintain zone heating and cooling setpoints by modulating the face and bypass dampers through one of the following:
   b. Cooling:
      1) When the zone temperature is greater than the cooling setpoint, the face and bypass dampers shall modulate open to face position (closed to bypass position) to maintain setpoint by modulating the air passing over the cooling coil.
      2) When the zone temperature is less than the cooling setpoint, the face and bypass dampers shall close to face position (open to bypass position).
   c. Heating:
      1) When the zone temperature is less than the heating setpoint, the face and bypass dampers shall modulate open to face position (closed to bypass position) to maintain setpoint by modulating the air passing over the heating coil.
      2) When the zone temperature is greater than the heating setpoint, the face and bypass dampers shall close to face position (open to bypass position).
9. Heating Coil Valve:
   a. The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint.
   b. The heating shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the zone temperature is below heating setpoint.
      3) AND the supply fan status is on.
      4) AND the cooling is not active.
   c. The heating coil valve shall open whenever the freezestat (if present) is on.
10. Exhaust fan interlock:
   a. The controller shall interlock exhaust fan to run during occupied times with 100% outside air.
   b. During unoccupied time fan shall remain off, outside air dampers closed and return air dampers 100% opening.
   c. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the supply fan status is on.
      4) AND exhaust fan is operating
   d. The economizer shall close whenever:
      1) Mixed air temperature drops from 45°F to 40°F (adj.).
      2) OR on loss of supply fan status.
      3) OR the freezestat (if present) is on.
   e. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
11. Mixed Air Temperature:
   a. The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
   b. Alarms shall be provided as follows:
      1) High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
      2) Low Mixed Air Temp: If the mixed air temperature is less than 45°F (adj.).
12. Return Air Temperature:
   a. The controller shall monitor the return air temperature and use as required for economizer control (if present).
   b. Alarms shall be provided as follows:
      1) High Return Air Temp: If the return air temperature is greater than 90°F (adj.).
      2) Low Return Air Temp: If the return air temperature is less than 45°F (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Face and Bypass Dampers		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Freezestat			x						x	x	x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Zone Override			x						x		x
Supply Fan Start/Stop				x					x		x
Exhaust Fan Status					x				x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			
High Mixed Air Temp										x	
High Return Air Temp										x	
High Zone Temp										x	
Low Mixed Air Temp										x	
Low Return Air Temp										x	
Low Zone Temp										x	
Supply Fan Failure										x	
Supply Fan in Hand										x	
Supply Fan Runtime Exceeded										x	
Totals	**4**	**3**	**4**	**1**	**3**	**0**	**0**	**1**	**14**	**11**	**15**

Total Hardware (12) **Total Software (29)**

E. RTU-1 Control:
   1. System:
      a. Occupied / unoccupied changeover shall be as programmed. Provide a 2-hour (adjustable) unoccupied override pushbutton at space sensors to provide occupied cycle operation when depressed.
      b. A low temperature protection thermostat, located on leaving face of remote heating coil shall stop unit fan and generate a low temperature alarm on sensing low coil discharge air temperatures.
      c. Occupied Cycle:
         1) Unit fan shall operate continuously with mixing dampers open to 25 percent (adjustable) minimum outdoor air position.
         2) A space sensor shall control heating coil valve or mixing dampers, from minimum, in sequence to maintain its temperature setting. Mixing dampers shall be under control when

outdoor air temperature drops to 60 degrees F. Mixing dampers shall remain at their minimum position and cooling coil control valve shall be controlled to provide required cooling when outdoor air temperature rises to 65 degrees F.

3) Provide a low limit mixed air sensor to override control of mixing dampers to prevent mixed air temperatures below 50 degrees F. A discharge air low limit sensor shall override control of heating coil control valve to prevent discharge air temperature from dropping below 60 degrees F. (adjustable)

d. Unoccupied Cycle:
   1) Unit shall be cycled on and off, at 100 percent return air and full heat, to maintain reduced space temperatures.
   2) Provide an optimized start warm-up / cool-down program to bring unit on, at 100 percent return air and occupied space temperature setting, to achieve space target temperatures at scheduled occupancy.

e. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.

2. Run Conditions - Scheduled:
   a. The unit shall run according to a user definable time schedule in the following modes:
      1) Occupied Mode: The unit shall maintain
         (a) A 75°F (adj.) cooling setpoint
         (b) A 70°F (adj.) heating setpoint.
      2) Unoccupied Mode (night setback): The unit shall maintain
         (a) A 85°F (adj.) cooling setpoint
         (b) A 55°F (adj.) heating setpoint.
3. Supply Air Temperature:
   a. The controller shall monitor the supply air temperature.
   b. Alarms shall be provided as follows:
      1) High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
      2) Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.)
4. Economizer:
   a. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 3°F less than the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
   b. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the Outside air enthalpy is less than the return air enthalpy.
      4) AND the supply fan status is on.
   c. The economizer shall close whenever:
      1) Outdoor air temperature is below 20°F (adj.).
      2) OR Mixed air temperature drops from 45°F to 40°F (adj.).
      3) OR on loss of supply fan status.
      4) OR the freezestat is on.
   d. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
5. Return Air Carbon Dioxide (CO_2) Concentration Monitoring:
   a. The controller shall measure the return air CO_2 concentration.
   b. Set damper maximum position 50%(adj) outside air.
   c. Alarms shall be provided as follows:
      1) High Return Air Carbon Dioxide Concentration: If the return air CO_2 concentration is greater than 1000ppm (adj.) when in the occupied mode.
6. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
7. Low limit at coil with unit shut down and outside air dampers closed and return air dampers in the open position.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Carbon Dioxide PPM	x								x		x
Zone Setpoint	x								x		X
Zone Setpoint Adjust	x								x		x
Zone Temp	x								x		x
Mixed Air Dampers		x							x		x
Supply Air Smoke Detector			x						x	x	x
Low Limit Status			x						x		x
Zone Override			x						x		x
Cooling Stage 1				x					x		x
Heating Stage 1				x					x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			x
High Return Air Carbon Dioxide Concentration										X	
Low Zone Temp										X	
Low limit alarm										X	
Supply Fan Failure										X	
Supply Fan in Hand										X	
Totals	**5**	**1**	**3**	**3**	**3**	**0**	**0**	**1**	**1**	**6**	**16**

Total Hardware (13) **Total Software (25)**

F. RTU-2 AND 3 Control:
   1. System:
      a. Occupied / unoccupied changeover shall be as programmed. Provide a 2-hour (adjustable) unoccupied override pushbutton at space sensors to provide occupied cycle operation when depressed.
      b. A low temperature protection thermostat, located on leaving face of remote heating coil shall stop unit fan and generate a low temperature alarm on sensing low coil discharge air temperatures.
      c. Occupied Cycle:
         1) Unit fan shall operate continuously with mixing dampers open to 25 percent (adjustable) minimum outdoor air position.
         2) A space sensor shall control heating coil valve or mixing dampers, from minimum, in sequence to maintain its temperature setting. Mixing dampers shall be under control when outdoor air temperature drops to 60 degrees F. Mixing dampers shall remain at their minimum position and cooling coil control valve shall be controlled to provide required cooling when outdoor air temperature rises to 65 degrees F.

3) Provide a low limit mixed air sensor to override control of mixing dampers to prevent mixed air temperatures below 50 degrees F. A discharge air low limit sensor shall override control of heating coil control valve to prevent discharge air temperature from dropping below 60 degrees F. (adjustable)

d. Unoccupied Cycle:
   1) Unit shall be cycled on and off, at 100 percent return air and full heat, to maintain reduced space temperatures.
   2) Provide an optimized start warm-up / cool-down program to bring unit on, at 100 percent return air and occupied space temperature setting, to achieve space target temperatures at scheduled occupancy.

e. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.

2. Run Conditions - Scheduled:
   a. The unit shall run according to a user definable time schedule in the following modes:
      1) Occupied Mode: The unit shall maintain:
         (a) A 75°F (adj.) cooling setpoint
         (b) A 70°F (adj.) heating setpoint.
      2) Unoccupied Mode (night setback): The unit shall maintain:
         (a) A 85°F (adj.) cooling setpoint.
         (b) A 55°F (adj.) heating setpoint.
3. Supply Air Temperature:
   a. The controller shall monitor the supply air temperature.
   b. Alarms shall be provided as follows:
      1) High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
      2) Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.)
4. Economizer:
   a. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 3°F less than the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
   b. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the Outside air enthalpy is less than the return air enthalpy.
      4) AND the supply fan status is on.
   c. The economizer shall close whenever:
      1) Outdoor air temperature is below 20°F (adj.).
      2) OR Mixed air temperature drops from 45°F to 40°F (adj.).
      3) OR on loss of supply fan status.
      4) OR the freezestat is on.
   d. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
5. Return Air Carbon Dioxide (CO2) Concentration Monitoring:
   a. The controller shall measure the return air CO2 concentration.
   b. Set damper maximum position 50%(adj) outside air.
   c. Alarms shall be provided as follows:
      1) High Return Air Carbon Dioxide Concentration: If the return air CO2 concentration is greater than 1000ppm (adj.) when in the occupied mode.
6. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
7. Low limit at coil with unit shut down and outside air dampers closed and return air dampers in the open position.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Carbon Dioxide PPM	x								x		x
Zone Setpoint	x								x		X
Zone Setpoint Adjust	x								x		x
Zone Temp	x								x		x
Mixed Air Dampers		x							x		x
Supply Air Smoke Detector			x						x	x	x
Low Limit Status			x						x		x
Zone Override			x						x		x
Cooling Stage 1				x					x		x
Heating Stage 1				x					x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			x
High Return Air Carbon Dioxide Concentration										X	
Low Zone Temp										X	
Low limit alarm										X	
Supply Fan Failure										X	
Supply Fan in Hand										X	
Totals	**5**	**1**	**3**	**3**	**3**	**0**	**0**	**1**	**1**	**6**	**16**
Total Hardware (13)					**Total Software (25)**						

G. Exhaust Fans Control:
   1. System:
      a. Fans shall run continuously when respective zones, or areas, are in occupied cycle of operation. Fans shall be off during unoccupied cycles of operation.
      b. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
   2. Fan Status:
      a. The controller shall monitor the fan status.
   3. Alarms shall be provided as follows:
      a. Fan Failure: Commanded on, but the status is off.
      b. Fan in Hand: Commanded off, but the status is on.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Fan Failure										x	x
Fan in Hand										x	x
Totals	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**4**

Total Hardware (2) **Total Software (4)**

H. Finned Tube Radiation (FT) - BAS Control:
   1. Run Conditions - Scheduled:
      a. The unit shall run according to a user definable time schedule in the following modes:
         1) Occupied Mode: The unit shall maintain a heating setpoint of 70°F (adj.).
         2) Unoccupied Mode (night setback): The unit shall maintain a heating setpoint of 65°F (adj.).
   2. Alarms shall be provided as follows:
      a. Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
   3. Heating Coil Valve:
      a. The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint.
      b. The heating shall be enabled whenever:
         1) Outside air temperature is less than 65°F (adj.).
         2) AND the zone temperature is below heating setpoint.
   4. The heating valve shall modulate 25% open when the outside air temperature is less than 30°F (adj.).
   5. Heating coil locked out during chilled cooling mode.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Zone Temp	x								x		x
Heating Valve		x							x		x
Heating Setpoint					x				x		x
Heating Min Setpoint on OA Temp					x						x
Schedule								x			x
Low Zone Temp										x	x
Totals	**1**	**1**	**0**	**0**	**2**	**0**	**0**	**1**	**3**	**1**	**7**

Total Hardware (2) **Total Software (7)**

1.04 HIGH SCHOOL

A. Exhaust Fans Control:
   1. System:

a. Fans shall run continuously when respective zones, or areas, are in occupied cycle of operation. Fans shall be off during unoccupied cycles of operation.
b. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.

2. Fan Status:
   a. The controller shall monitor the fan status.
3. Alarms shall be provided as follows:
   a. Fan Failure: Commanded on, but the status is off.
   b. Fan in Hand: Commanded off, but the status is on.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Fan Failure										x	x
Fan in Hand										x	x
Totals	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**4**

Total Hardware (2) **Total Software (4)**

1.05 PINE RIVER ELEMENTARY SCHOOL

A. RTU-1 and 2 Control:
1. System:
   a. Occupied / unoccupied changeover shall be as programmed. Provide a 2-hour (adjustable) unoccupied override pushbutton at space sensors to provide occupied cycle operation when depressed.
   b. A low temperature protection thermostat, located on leaving face of remote heating coil shall stop unit fan and generate a low temperature alarm on sensing low coil discharge air temperatures.
   c. Occupied Cycle:
      1) Unit fan shall operate continuously with mixing dampers open to 25 percent (adjustable) minimum outdoor air position.
      2) A space sensor shall control heating coil valve or mixing dampers, from minimum, in sequence to maintain its temperature setting. Mixing dampers shall be under control when outdoor air temperature drops to 60 degrees F. Mixing dampers shall remain at their minimum position and cooling coil control valve shall be controlled to provide required cooling when outdoor air temperature rises to 65 degrees F.
      3) Provide a low limit mixed air sensor to override control of mixing dampers to prevent mixed air temperatures below 50 degrees F. A discharge air low limit sensor shall override control of heating coil control valve to prevent discharge air temperature from dropping below 60 degrees F. (adjustable)
   d. Unoccupied Cycle:
      1) Unit shall be cycled on and off, at 100 percent return air and full heat, to maintain reduced space temperatures.
      2) Provide an optimized start warm-up / cool-down program to bring unit on, at 100 percent return air and occupied space temperature setting, to achieve space target temperatures at scheduled occupancy.
   e. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
2. Run Conditions - Scheduled:
   a. The unit shall run according to a user definable time schedule in the following modes:
      1) Occupied Mode: The unit shall maintain
         (a) A 75°F (adj.) cooling setpoint

(b) A 70°F (adj.) heating setpoint.
2) Unoccupied Mode (night setback): The unit shall maintain
(a) A 85°F (adj.) cooling setpoint.
(b) A 55°F (adj.) heating setpoint.

3. Supply Air Temperature:
   a. The controller shall monitor the supply air temperature.
   b. Alarms shall be provided as follows:
      1) High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
      2) Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.)
4. Economizer:
   a. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 3°F less than the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
   b. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the Outside air enthalpy is less than the return air enthalpy.
      4) AND the supply fan status is on.
   c. The economizer shall close whenever:
      1) Outdoor air temperature is below 20°F (adj.).
      2) OR Mixed air temperature drops from 45°F to 40°F (adj.).
      3) OR on loss of supply fan status.
      4) OR the freezestat is on.
   d. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
5. Return Air Carbon Dioxide (CO2) Concentration Monitoring:
   a. The controller shall measure the return air CO2 concentration.
   b. Set damper maximum position 50%(adj) outside air.
   c. Alarms shall be provided as follows:
      1) High Return Air Carbon Dioxide Concentration: If the return air CO2 concentration is greater than 1000ppm (adj.) when in the occupied mode.
6. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
7. Low limit at coil with unit shut down and outside air dampers closed and return air dampers in the open position.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Carbon Dioxide PPM	x								x		x
Zone Setpoint	x								x		X
Zone Setpoint Adjust	x								x		x
Zone Temp	x								x		x
Mixed Air Dampers		x							x		x
Supply Air Smoke Detector			x						x	x	x
Low Limit Status			x						x		x
Zone Override			x						x		x
Cooling Stage 1				x					x		x

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Heating Stage 1				x					x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			x
High Return Air Carbon Dioxide Concentration										X	
Low Zone Temp										X	
Low limit alarm										X	
Supply Fan Failure										X	
Supply Fan in Hand										X	
Totals	**5**	**1**	**3**	**3**	**3**	**0**	**0**	**1**	**1**	**6**	**16**

Total Hardware (13) **Total Software (25)**

B. Exhaust Fans Control:
   1. System:
      a. Fans shall run continuously when respective zones, or areas, are in occupied cycle of operation. Fans shall be off during unoccupied cycles of operation.
      b. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
   2. Fan Status:
      a. The controller shall monitor the fan status.
   3. Alarms shall be provided as follows:
      a. Fan Failure: Commanded on, but the status is off.
      b. Fan in Hand: Commanded off, but the status is on.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Fan Failure										x	x
Fan in Hand										x	x
Totals	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**4**

Total Hardware (2) **Total Software (4)**

1.06 FLOYD ELEMENTARY SCHOOL

A. Unit Ventilator Control:
   1. System:

a. Occupied / unoccupied changeover shall be programmed. Provide a 3-hour unoccupied override pushbuttons, at space sensors, to cause units to operate in occupied cycle when depressed.
b. Low temperature protection thermostats, located on leaving face of heating coils, shall stop unit fans sensing low coil discharge air temperatures.
c. Heating or cooling mode of operation shall be controlled by outdoor air temperature and chiller operation. Units shall operate in heating mode when outdoor air temperature drops to 60 degrees F and will shift to cooling mode when outdoor air temperature rises to 65 degrees F and chiller is in operation.
d. Heating-Occupied Cycle:
    1) Unit fans shall operate continuously. Cooling coil end of cycle isolation valves shall be closed and heating coil and of cycle isolation valves shall be open. A call for full heat shall occur when space temperature is less than 2 degrees F. below temperature setting on space temperature sensor. At this time outdoor, exhaust, and return air dampers shall be in 100 percent return air position. As space temperatures continue to rise, outdoor and return air mixing dampers reposition to minimum outdoor air positions. On a continued rise in space temperature, toward space temperature settings economizer shall modulate to satisfy space temperature. A low limit discharge air sensor shall override control of dampers to prevent discharge air temperature from dropping below 65 degrees F.
    2) On a drop in space temperature, reverse shall occur.
e. Heating-Unoccupied Cycle:
    1) Units shall be cycled on and off, at 100 percent return air and full heat, to maintain reduced space temperatures.
    2) Provide and optimized warm-up cycle to start units at 100 percent return air and occupied space temperature settings, to provide space target temperatures at scheduled occupancy.
f. Cooling-Occupied Cycle: Unit fans shall operate continuously and outdoor and return air mixing dampers shall be at their minimum positions. Space sensors shall control economizer to maintain their space temperature settings.
g. Cooling Stage:
    The controller shall measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, the stage shall have a 5 minute (adj.) minimum runtime.
h. The cooling shall be enabled whenever:
    1) Outside air temperature is greater than 60°F (adj.).
    2) AND the zone temperature is above cooling setpoint.
    3) AND the fan is on.
i. Cooling-Unoccupied Cycle:
    1) Units shall be off and remain inoperable.
    2) Provide an optimized start program to bring units on, prior to occupancy, at occupied space temperatures settings to achieve space target temperatures at scheduled occupancy.
j. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system alarms shall be provided as follows:
    1) High Zone Carbon Dioxide Concentration: If the zone CO2 concentration is greater than 1000ppm (adj.) when in the occupied mode.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Discharge Air Temp	x								x		x
Zone Carbon Dioxide PPM	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Freezestat			x						x	x	x
Zone Override			x						x		x
Cooling Stage 1				x					x		x
Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Heating Setpoint					x				x		x
Economizer Disable Setpoint					x				x		x
Schedule								x		x	x
Fan Failure										x	x
Low Zone Temp										x	x
Totals	4	3	3	2	4	0	0	1	15	5	19
Total Hardware (12)											

B. Boiler Coil - Controls:
   1. Run Conditions - Scheduled:
      a. The unit shall run according to a user definable time schedule in the following modes:
         1) Occupied Mode: The unit shall maintain:
            (c) A 75°F (adj.) cooling setpoint
            (d) A 70°F (adj.) heating setpoint.
         2) Unoccupied Mode (night setback): The unit shall maintain
            (e) A 85°F (adj.) cooling setpoint.
            (f) A 55°F (adj.) heating setpoint.
   2. Alarms shall be provided as follows:
      a. High Zone Temp:
         1) If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
      b. Low Zone Temp:
         1) If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
   3. Zone Setpoint Adjust:
      a. The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
   4. Zone Optimal Start:
      a. The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
   5. Zone Unoccupied Override:
      a. A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
   6. Freeze Protection:
      a. The unit shall shut down and generate an alarm upon receiving a freezestat status.
   7. Supply Air Smoke Detection:

a. The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.

8. Supply Fan:
   a. The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
   b. Alarms shall be provided as follows:
      1) Supply Fan Failure: Commanded on, but the status is off.
      2) Supply Fan in Hand: Commanded off, but the status is on.
      3) Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).
9. Heating Coil Valve:
   a. The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint.
   b. The heating shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the zone temperature is below heating setpoint.
      3) AND the supply fan status is on.
      4) AND the cooling is not active.
   c. The heating coil valve shall open whenever the freezestat (if present) is on.
10. Cooling Stage:
    The controller shall measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, the stage shall have a 5 minute (adj.) minimum runtime.
   a. The cooling shall be enabled whenever:
      1) Outside air temperature is greater than 60°F (adj.).
      2) AND the zone temperature is above cooling setpoint.
      3) AND the fan is on.
   b. Cooling-Unoccupied Cycle:
      1) Units shall be off and remain inoperable.
      2) Provide an optimized start program to bring units on, prior to occupancy, at occupied space temperatures settings to achieve space target temperatures at scheduled occupancy.
11. Mixed Air Temperature:
   a. The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
   b. Alarms shall be provided as follows:
      1) High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
      2) Low Mixed Air Temp: If the mixed air temperature is less than 45°F (adj.).
12. Return Air Temperature:
   a. The controller shall monitor the return air temperature and use as required for economizer control (if present).
   b. Alarms shall be provided as follows:
      1) High Return Air Temp: If the return air temperature is greater than 90°F (adj.).
      2) Low Return Air Temp: If the return air temperature is less than 45°F (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Cooling Status		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Freezestat			x						x	x	x
Return Fan Status			x						x		x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Zone Override			x						x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			
High Mixed Air Temp										x	
High Return Air Temp										x	
High Zone Temp										x	
Low Mixed Air Temp										x	
Low Return Air Temp										x	
Low Zone Temp										x	
Supply Fan Failure										x	
Totals	**4**	**3**	**5**	**2**	**3**	**0**	**0**	**1**	**16**	**14**	**17**

Total Hardware (14) **Total Software (34)**

C. Air Handling Unit - Controls:
   1. Run Conditions - Scheduled:
      a. The unit shall run according to a user definable time schedule in the following modes:
         1) Occupied Mode: The unit shall maintain
            (g) A 75°F (adj.) cooling setpoint
            (h) A 70°F (adj.) heating setpoint.
         2) Unoccupied Mode (night setback): The unit shall maintain
            (i) A 85°F (adj.) cooling setpoint.
            (j) A 55°F (adj.) heating setpoint.
   2. Alarms shall be provided as follows:
      a. High Zone Temp:
         1) If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
      b. Low Zone Temp:
         1) If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
   3. Zone Setpoint Adjust:
      a. The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
   4. Zone Optimal Start:
      a. The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
   5. Zone Unoccupied Override:

a. A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.

6. Freeze Protection:
   a. The unit shall shut down and generate an alarm upon receiving a freezestat status.
7. Supply Air Smoke Detection:
   a. The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.

8. Supply Fan:
   a. The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
   b. Alarms shall be provided as follows:
      1) Supply Fan Failure: Commanded on, but the status is off.
      2) Supply Fan in Hand: Commanded off, but the status is on.
      3) Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).
9. Heating Coil Valve:
   a. The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint.
   b. The heating shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the zone temperature is below heating setpoint.
      3) AND the supply fan status is on.
      4) AND the cooling is not active.
   c. The heating coil valve shall open whenever the freezestat (if present) is on.
10. Economizer:
   a. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 2°F less than the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
   b. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 65°F (adj.).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the supply fan status is on.
   c. The economizer shall close whenever:
      1) Mixed air temperature drops from 45°F to 40°F (adj.).
      2) OR on loss of supply fan status.
      3) OR the freezestat (if present) is on.
   d. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
11. Minimum Outside Air Ventilation - Fixed Percentage:
   a. The outside air dampers shall maintain a minimum position (adj.) during building occupied hours and be closed during unoccupied hours.
12. Mixed Air Temperature:
   a. The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
   b. Alarms shall be provided as follows:
      1) High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
      2) Low Mixed Air Temp: If the mixed air temperature is less than 45°F (adj.).
13. Return Air Temperature:
   a. The controller shall monitor the return air temperature and use as required for economizer control (if present).
   b. Alarms shall be provided as follows:
      1) High Return Air Temp: If the return air temperature is greater than 90°F (adj.).

2) Low Return Air Temp: If the return air temperature is less than 45°F (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Mixed Air Temp	x								x		x
Return Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Freezestat			x						x	x	x
Return Fan Status			x						x		x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Zone Override			x						x		x
Return Fan Start/Stop				x					x		x
Supply Fan Start/Stop				x					x		x
Economizer Zone Temp Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			
High Mixed Air Temp										x	
High Return Air Temp										x	
High Zone Temp										x	
Low Mixed Air Temp										x	
Low Return Air Temp										x	
Low Zone Temp										x	
Supply Fan Failure										x	
Supply Fan in Hand										x	
Supply Fan Runtime Exceeded										x	
Totals	4	3	5	2	3	0	0	1	16	14	17

D. Exhaust Fans Control:
   1. System:
      a. Fans shall run continuously when respective zones, or areas, are in occupied cycle of operation. Fans shall be off during unoccupied cycles of operation.
      b. Enable, failure alarm, and capacity requirements shall be interfaces to EMS system.
   2. Fan Status:
      a. The controller shall monitor the fan status.
   3. Alarms shall be provided as follows:
      a. Fan Failure: Commanded on, but the status is off.
      b. Fan in Hand: Commanded off, but the status is on.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Fan Failure										x	x
Fan in Hand										x	x
Totals	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**4**

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and pipe fittings for:
   1. Heating water piping system.
   2. Equipment drains and overflows.

B. Valves:
   1. Gate valves.
   2. Ball valves.
   3. Butterfly valves.
   4. Check valves.

1.02 RELATED REQUIREMENTS

A. Section 23 05 53 - Identification for HVAC Piping and Equipment.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 21 14 - Hydronic Specialties.

D. Section 23 25 00 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

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-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. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023.

H. ASTM B32 - Standard Specification for Solder Metal; 2020.

I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

K. AWWA C606 - Grooved and Shouldered Joints; 2022.

L. MSS SP-58 - Pipe Hangers and Supports- Materials, Design, Manufacture, Selection, Application, and Installation; 2025.

1.04 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Use grooved mechanical couplings and fasteners in accessible locations.

C. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.

D. Use non-conducting dielectric connections whenever jointing dissimilar metals in open systems.

E. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-69 unless indicated otherwise.

F. Use ball, or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers for 1/2 inch to 2-1/2 inch piping.

G. Use ball or butterfly valves for throttling, bypass, or manual flow control services.

H. Use butterfly valves in heating water systems interchangeably with gate and globe valves.

I. Use lug end butterfly valves to isolate equipment.

J. Use 3/4 inch gate or ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment. Pipe to nearest floor drain.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Include data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Project Record Documents: Record actual locations of valves.

D. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum five (5) years of experience.

C. Welder Qualifications: Certify in accordance with ASME (BPV IX).

1.07 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 code for installation of piping system.

B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.09 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

1.10 EXTRA MATERIALS

A. Provide two repacking kits for each size and valve type.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   3. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated and as follows.

2.02 HEATING WATER PIPING, ABOVE GROUND

A. Steel Pipe (3/4 inch thru 6 inches): ASTM A53 or A106, Schedule 40, black.
   1. Fittings: ASME B16.5, ASME B16.9, ASME B16.11, ASME B16.28, or ASTM
   2. A 420 wrought carbon steel or alloy steel welding type fittings.
   3. Joints: Screwed or ANSI/AWS D1.1 welded.

B. Copper Tubing: ASTM B88, Type L, hard drawn.
   1. Fittings: ANSI/ASME B16.23 cast brass of ANSI/ASME B16.29 solder wrought copper.
   2. Joints: ASTM B32, solder, Grade Sn94, Sn95, E, AC, or AM; or ANSI/AWS A5.8, BCuP silver braze.

2.03 EQUIPMENT DRAINS AND OVERFLOWS

A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:
   1. Threaded Joints: Galvanized cast iron, or ASME B16.3 malleable iron fittings.
   2. Joints: Threaded, or grooved mechanical couplings.

B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn; using one of the following joint types:
   1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
   3. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

2.04 PIPE HANGERS AND SUPPORTS

A. Conform to ASME B31.9.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

F. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

G. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.

H. Vertical Support: Steel riser clamp.

I. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

J. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

K. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

L. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

M. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.05 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 Inches and Under:
   1. Ferrous Piping: 150 psig malleable iron, Victaulic Pressfit or threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe Over 2 Inches:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Copper Piping: Bronze.
   3. Gaskets: 1/16 inch thick preformed neoprene.

C. Dielectric Connections: Union or waterway fitting with water impervious isolation barrier and one galvanized or plated steel end and one copper tube end, end types to match pipe joint types used.

2.06 GATE VALVES

A. Manufacturers:
   1. Conbraco Industries: www.conbraco.com.
   2. Nibco, Inc: www.nibco.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Up To and Including 2 Inches:
   1. Bronze body, bronze trim, screwed bonnet, non-rising stem, handwheel, inside screw with backseating stem, solid wedge disc, alloy seat rings, solder or threaded ends.

C. Over 2 Inches:
   1. Iron body, bronze trim, bolted bonnet, rising stem, handwheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends.

2.07 BALL VALVES

A. Manufacturers:
   1. Conbraco Industries: www.conbraco.com.
   2. Nibco, Inc: www.nibco.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Up To and Including 2 Inches:
   1. Bronze one piece body, stainless steel ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder or threaded ends with union.

C. Over 2 Inches:
   1. Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, flanged.

2.08 BUTTERFLY VALVES

A. Manufacturers:
   1. Hammond Valve: www.hammondvalve.com.
   2. Crane Co.: www.cranevalve.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer or lug ends, extended neck.

C. Disc: Stainless steel.

D. Operator: Infinite position lever handle with memory stop.

2.09 SPRING LOADED CHECK VALVES

A. Manufacturers:
   1. Hammond Valve: www.hammondvalve.com.
   2. Crane Co.: www.cranevalve.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Iron body, bronze trim, split plate, hinged with stainless steel spring, resilient seal bonded to body, wafer or threaded lug ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. Refer to Section 23 25 00 for additional requirements.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and to avoid interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Sleeve pipe passing through partitions, walls and floors.

F. Slope piping and arrange to drain at low points.

G. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

H. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   8. Provide copper plated hangers and supports for copper piping.
   9. Prime coat exposed steel hangers and supports. Refer to Section 09 90 00. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

I. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 31 00.

J. Use eccentric reducers to maintain top of pipe level.

K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

L. Install valves with stems upright or horizontal, not inverted.

3.03 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
   2. 1 inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
   3. 1-1/2 inch and 2 inch: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   4. 2-1/2 inch: Maximum span, 9 feet; minimum rod size, 3/8 inch.
   5. 3 inch: Maximum span, 10 feet; minimum rod size, 3/8 inch.
   6. 4 inch: Maximum span, 12 feet; minimum rod size, 1/2 inch.
   7. 6 inch: Maximum span, 14 feet; minimum rod size, 1/2 inch.
   8. 8 inch: Maximum span, 16 feet; minimum rod size, 5/8 inch.
   9. 10 inch: Maximum span, 18 feet; minimum rod size, 3/4 inch.
   10. 12 inch: Maximum span, 19 feet; minimum rod size, 7/8 inch.

B. Hanger Spacing for Steel Piping.
   1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
   2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
   4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
   5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
   6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
   7. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
   8. 6 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.
   9. 8 inches: Maximum span, 19 feet; minimum rod size, 5/8 inch.

END OF SECTION

SECTION 23 21 14
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air vents.

B. Air separators.

C. Suction diffusers.

D. Combination pump discharge valves.

E. Pressure-temperature test plugs.

F. Combination flow controls.

G. Combination fittings.

H. Relief valves.

I. Pressure reducing valves.

1.02 RELATED REQUIREMENTS

A. Section 22 10 06 - Plumbing Piping Specialties: Backflow Preventers.

B. Section 23 21 13 - Hydronic Piping.

C. Section 23 25 00 - HVAC Water Treatment: Pipe Cleaning.

1.03 REFERENCE STANDARDS

A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.

C. Certificates: Inspection certificates for pressure vessels from authority having jurisdiction.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of flow controls.

F. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 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 AIR VENTS

A. Manufacturers:

1. Armstrong International, Inc: www.armstronginternational.com.
2. ITT Bell & Gossett: www.bellgossett.com.
3. Taco, Inc: www.taco-hvac.com.

B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

C. Float Type:
   1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
   2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

D. Washer Type:
   1. Brass with hygroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.02 AIR SEPARATORS

A. Combination Air Separators/Strainers:
   1. Manufacturers:
      a. Armstrong International, Inc: www.armstronginternational.com.
      b. ITT Bell & Gossett: www.bellgossett.com.
      c. Taco, Inc: www.taco-hvac.com.
   2. Steel, tested and stamped in accordance with ASME (BPV VIII, 1); for 125 psi operating pressure, with integral bronze strainer, tangential inlet and outlet connections, and internal stainless steel air collector tube.

2.03 STRAINERS

A. Manufacturers:
   1. Flexicraft Industries: www.flexicraft.com.
   2. NIBCO: www.nibco.com.
   3. Spirax-Sarco Limited: www.spiraxsarco.com.
   4. The Metraflex Company: www.metraflex.com.
   5. Bell and Gosset.
   6. TACO.

B. Size 2 inch and Under:
   1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

C. Size 2-1/2 inch to 4 inch:
   1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 1/16 inch or 3/64 inch stainless steel perforated screen.
   2. Flanged iron body for 175 psi working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

2.04 SUCTION DIFFUSERS

A. Manufacturers:
   1. Anvil International, Inc: www.anvilintl.com.
   2. Grinnell Mechanical Products, a Tyco International Co: www.grinnell.com.
   3. ITT Bell & Gossett: www.bellgossett.com.
   4. Victaulic Company of America: www.victaulic.com.

B. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psi working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable 5/32 inch mesh strainer to fit over cylinder strainer, 20 mesh start up screen, and permanent magnet located in flow stream and removable for cleaning.

C. Accessories: Adjustable foot support, blowdown tapping in bottom, gage tapping in side.

2.05 COMBINATION PUMP DISCHARGE VALVES

A. Manufacturers:
   1. Crane Co.: www.cranevalve.com.
   2. Taco, Inc: www.taco-hvac.com.
   3. Victaulic Company of America: www.victaulic.com.

B. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.06 PRESSURE-TEMPERATURE TEST PLUGS

A. Manufacturers:
   1. Peterson Equipment Company Inc: www.petesplug.com.
   2. Sisco Manufacturing Company Inc: www.siscomfg.com.
   3. Ferguson Enterprises Inc: www.fnw.com.

B. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.

C. Application: Use extended length plugs to clear insulated piping.

2.07 COMBINATION FLOW CONTROLS

A. Manufacturers:
   1. Armstrong International: www.armstronginternational.com
   2. ITT Bell & Gossett: www.bellgossett.com.
   3. Taco Inc: www.taco-hvac.com.
   4. Tyco Flow Control: www.tycoflowcontrol.com.

B. Construction: Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet with blowdown/backflush drain.

C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.

D. Control Mechanism: Stainless steel or nickel plated brass piston or regulator cup, operating against stainless steel helical or wave formed spring.

E. Accessories: In-line strainer on inlet and ball valve on outlet.

2.08 RELIEF VALVES

A. Manufacturers:
   1. Armstrong International, Inc: www.armstronginternational.com.
   2. ITT Bell & Gossett: www.bellgossett.com.
   3. Conbraco Industries, Inc: www.conbraco.com.

B. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled

2.09 PRESSURE REDUCING VALVES

A. Manufacturers:
   1. Armstrong International, Inc: www.armstronginternational.com.
   2. ITT Bell & Gossett: www.bellgossett.com.
   3. Taco, Inc: www.taco-hvac.com.

B. Operation: Automatically feeds make-up water to the hydronic system whenever pressure in the system drops below the pressure setting of the valve. Refer to Section 23 21 13.

C. Materials of Construction:
   1. Valve Body: Constructed of bronze, cast iron, brass, iron.
   2. Internal Components: Construct of stainless steel, brass and engineered plastics, composition material,

D. Connections:
   1. NPT threaded: 0.50 inch, 0.75 inch, inch.
   2. Soldered: 0.50 inch, inch.

E. Provide integral check valve and strainer.

F. Maximum Inlet Pressure: 100 psi.

G. Maximum Fluid Temperature: 180 degrees F.

H. Operating Pressure Range: Between 10 psi and 25 psi.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Where large air quantities can accumulate, provide enlarged air collection standpipes.

C. Provide manual air vents at system high points and as indicated.

D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

E. Provide air separator on suction side of system circulation pump and connect to expansion tank.

F. Provide valved drain and hose connection on strainer blow down connection.

G. Provide pump suction fitting on suction side of base mounted centrifugal pumps where indicated. Remove temporary strainers after cleaning systems.

H. Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps where indicated.

I. Support pump fittings with floor mounted pipe and flange supports.

J. Provide radiator balancing valves on water outlet from terminal heating units such as radiation, unit heaters, and fan coil units.

K. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

L. Pipe relief valve outlet to nearest floor drain.

M. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

N. Clean and flush system before adding water. Refer to Section 23 25 00.

O. Feed water to system through make-up line with pressure regulator, venting system high points. Pressure system cold at 5 psi.

END OF SECTION

SECTION 23 21 23
HYDRONIC PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vertical in-line pumps.

B. Base mounted pumps.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 21 13 - Hydronic Piping.

D. Section 23 21 14 - Hydronic Specialties.

1.03 REFERENCE STANDARDS

A. NEMA MG 00001 - Motors and Generators; 2024.

B. NEMA OS1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).

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

D. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

1.04 PERFORMANCE REQUIREMENTS

A. 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.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Pump Seals: One set for each type and size of pump.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

1.07 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by UL 778 as suitable for the purpose specified and indicated.

B. Pump motors to be rated for variable frequency drive control.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Armstrong Pumps Inc: www.armstrongpumps.com.

B. ITT Bell & Gossett: www.bellgossett.com.

C. TACO, Inc: www.tacopumps.com

2.02 SYSTEM LUBRICATED CIRCULATORS

A. Type: Horizontal shaft, single stage, direct connected with multiple speed wet rotor motor for in-line mounting, for 140 psi maximum working pressure, 230 degrees F maximum water temperature.

B. Casing: Cast iron, with suction and discharge gage port, casing wear ring, seal flush connection, drain plug, flanged suction and discharge.

C. Impeller: Bronze, fully enclosed, keyed directly to motor shaft or extension.

D. Shaft: Carbon steel with stainless steel impeller cap screw or nut and bronze sleeve.

E. Seal: Mechanical seal, 275 degrees F maximum continuous operating temperature. (EPR/SiC/SiC) rated for pH (7.0 to 12.5) for glycol.

F. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 250 degrees F maximum continuous operating temperature.

G. Performance:
   1. See schedule on drawings.

H. Electrical Characteristics:
   1. See drawings.

2.03 BASE MOUNTED PUMPS

A. Type: Horizontal shaft, single stage, direct connected, radially or horizontally split casing, for 125 psi maximum working pressure.

B. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.

C. Impeller: Bronze, fully enclosed, keyed to shaft.

D. Bearings: Oil lubricated roller or ball bearings.

E. Shaft: Alloy steel with copper, bronze, or stainless steel shaft sleeve.

F. Seal: Mechanical seal, 275 degrees F maximum continuous operating temperature. (EPR/SiC/SiC) rated for pH (7.0 to 12.5) for glycol.

G. Drive: Flexible coupling with coupling guard.

H. Baseplate: Cast iron or fabricated steel with integral drain rim.

I. Performance:
   1. See schedule on drawings.

J. Electrical Characteristics:
   1. See drawings.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.

C. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For close coupled or base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.

D. Provide line sized shut-off valve on pump suction, and line sized soft seat check valve and balancing valve on pump discharge.

E. Provide air cock and drain connection on horizontal pump casings.

F. Provide drains for bases and seals, piped to and discharging into floor drains.

G. Check, align, and certify alignment of base mounted pumps prior to start-up.

H. Install close coupled and base mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place.

I. Lubricate pumps before start-up.

END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping.

B. Refrigerant.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 07 19 - HVAC Piping Insulation.

1.03 REFERENCE STANDARDS

A. AHRI 495 - Performance Rating of Refrigerant Liquid Receivers; 2005.

B. AHRI 710 (I-P) - Performance Rating of Liquid-Line Driers; 2009.

C. AHRI 711 (SI) - Performance Rating of Liquid-Line Driers; 2009.

D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Errata (2023).

E. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2024, with Addendum (2025).

F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2024.

H. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2022.

I. ASME B31.9 - Building Services Piping; 2025.

J. 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.

K. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

L. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

M. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023.

N. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

O. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

P. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2023.

Q. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 2024.

R. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2026.

S. AWS D1.1/D1.1M - Structural Welding Code- Steel; 2020, with Errata (2022).

T. MSS SP-58 - Pipe Hangers and Supports- Materials, Design, Manufacture, Selection, Application, and Installation; 2025.

U. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

1.04 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

C. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

C. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.

D. Design Data: Submit design data indicating pipe sizing. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.

B. Design piping system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State of Michigan.

1.07 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 for installation of piping system.

B. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

C. Welders Certification: In accordance with ASME BPVC-IX.

D. Products Requiring Electrical Connection: Listed and classified by UL, as suitable for the purpose indicated.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.01 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8/A5.8 BCuP silver/phosphorus/copper alloy.

B. Pipe Supports and Anchors:
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Conform to ASME B31.5.
   3. Conform to ASME B31.5.
   4. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.
   5. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   9. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
   10. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
   11. Supports at grade: Plastic base pedestals that rest on leveled ground not requiring any attachment
      a. Bases: High density polypropylene.
      b. Base Sizes: As required to distribute load sufficiently.

c. Steel Components: Stainless steel, or 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.

2.02 REFRIGERANT

A. Refrigerant: Use only refrigerants that have ozone depletion potential (OPD) of zero and global warming potential (GWP) no greater than that allowed by federal code.

B. Refrigerant: R32 refrigerant as defined in ASHRAE Std 34.

2.03 MOISTURE AND LIQUID INDICATORS

A. Manufacturers:
1. Henry Technologies: www.henrytech.com.
2. Parker Hannifin/Refrigeration and Air Conditioning: www.parker.com.
3. Sporlan Valve Company: www.sporlan.com.

B. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.04 VALVES

A. Manufacturers:
1. Hansen Technologies Corporation: www.hantech.com.
2. Henry Technologies: www.henrytech.com.
3. Danfoss Flomatic: www.flomatic.com.

B. Ball Valves:
1. Two piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals; for maximum working pressure of 500 psi and maximum temperature of 300 degrees F.

C. Service Valves:
1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:
1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   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.

H. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

I. Provide clearance for installation of insulation and access to valves and fittings.

J. Flood piping system with nitrogen when brazing.

K. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

L. Insulate piping; refer to Section.

M. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.

N. Provide replaceable cartridge filter-driers, with isolation valves and valved bypass.

O. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

P. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.

Q. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.

R. Fully charge completed system with refrigerant after testing.

S. Provide intermediate trap in vertical risers that exceed 25 feet.

3.03 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.

B. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test to no leakage.

3.04 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
   2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.
   3. 1-3/8 inch OD: Maximum span, 7 feet; minimum rod size, 3/8 inch.
   4. 1-5/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   5. 2-1/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   6. 2-5/8 inch OD: Maximum span, 9 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 23 25 00
HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cleaning of piping systems.

B. Chemical feeder equipment.

C. Chemical treatment.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

B. Section 23 21 14 - Hydronic Specialties.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

C. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

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. Company shall have local representatives with water analysis laboratories and full time service personnel.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of experience and approved by manufacturer.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

PART 2 PRODUCTS

2.01 MATERIALS

A. System Cleaner:
   1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.

B. Closed System Treatment (Water):
   1. Sequestering agent to reduce deposits and adjust pH.
   2. Corrosion inhibitors liquid boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.
   3. Conductivity enhancers; phosphates or phosphonates.

2.02 BY-PASS (POT) FEEDER

A. Two quart quick opening cap for working pressure of 175 psi.

2.03 TEST EQUIPMENT

A. Provide white enamel test cabinet with local and fluorescent light, capable of accommodating 4 - 10 ml zeroing titrating burettes and associated reagents.

B. Provide the following test kits:
   1. Alkalinity titration test kit.
   2. Chloride titration test kit.
   3. Sulphite titration test kit.
   4. Total hardness titration test kit.
   5. Low phosphate test kit.

6. Conductivity bridge, range 0 - 10,000 micro-ohms.
7. Creosol red pH slide complete with reagent.
8. Portable electronic conductivity meter.
9. High nitrite test kit.

PART 3 EXECUTION

3.01 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.02 CLEANING SEQUENCE

A. Concentration:
   1. As recommended by manufacturer.
   2. One pound per 100 gallons of water contained in the system.
   3. One pound per 100 gallons of water for hot systems and one pound per 50 gallons of water for cold systems.
   4. Fill steam boilers only with cleaner and water.

B. Hot Water Heating Systems:
   1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
   2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
   3. Circulate for 6 hours at design temperatures, then drain.
   4. Refill with clean water and repeat until system cleaner is removed.

C. Use neutralizer agents on recommendation of system cleaner supplier and approval of Design Professional.

D. Flush open systems and glycol filled closed systems with clean water for one hour minimum. Drain completely and refill.

E. Remove, clean, and replace strainer screens.

F. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.04 CLOSED SYSTEM TREATMENT

A. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.

B. Introduce closed system treatment through bypass feeder when required or indicated by test.

C. Provide 3/4 inch water coupon rack around circulating pumps with space for 4 test specimens.

3.05 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation and maintenance of chemical treatment system.
   1. Provide minimum of two hours of instruction for two people.
   2. Have operation and maintenance data prepared and available for review during training.
   3. Conduct training using actual equipment after treated system has been put into full operation.

3.06 MAINTENANCE

A. See Construction Manager's General Requirements, for additional requirements relating to maintenance service.

B. Provide a separate maintenance contract for specified maintenance service.

C. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the equipment manufacturer or original installer.

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

E. Provide service and maintenance of treatment systems for one year from Date of Substantial Completion.

F. Provide quarterly technical service visits to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements, and corrective actions needed. Submit two copies of field service report after each visit.

G. Provide laboratory and technical assistance services during this maintenance period.

H. Provide on site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

END OF SECTION

SECTION 23 31 00

HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.

B. Duct cleaning.

1.02 RELATED REQUIREMENTS

A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

B. Section 23 33 00 - Air Duct Accessories.

C. Section 23 37 00 - Air Outlets and Inlets.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

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

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2021a.

E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low-Alloy With Improved Formability, and Ultra-High Strength; 2018a.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM C14/C14M - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe; 2020.

H. ASTM C443/C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2021.

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

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

K. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2021.

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

M. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.

N. SMACNA (FGD) - Fibrous Glass Duct Construction Standards; 2021.

O. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.04 PERFORMANCE REQUIREMENTS

A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for low pressure class and higher systems.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) – HVAC Air Duct Leakage Test Manual.

D. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of documented experience.

1.07 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

1.08 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 MATERIALS

A. Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Un-Galvanized Steel for Ducts: ASTM A1008/A1008M, Designation CS, cold-rolled commercial steel.

C. Stainless Steel for Ducts: ASTM A240/A 40M, Type 304.

D. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. 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.
   2. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.

E. Hanger Rod: ASTMA36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

F. 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.

G. Insulated Flexible Ducts:
   1. Two ply vinyl film supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
      a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
      b. Maximum Velocity: 4000 fpm.
      c. Temperature Range: -10 degrees F to 160 degrees F.

2.02 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

C. Low Pressure Supply (Heating & Cooling Systems): 1 inch w.g. pressure class, galvanized steel.

D. Kitchen Cooking Hood Exhaust: 18 gage, 0.048 inch stainless steel sheet, ASTM A666; with external seams welded continuously, liquid-tight; see drawings for extent, location, and size of exhaust ducts.
   1. Where ducts penetrate ceilings or walls, provide stainless steel angle flange trim with welded corners, 16 gage, 0.06 inch minimum thickness.

2. Where ducts penetrate hood body, provide stainless steel angle flange trim with welded corners and seal joints liquid-tight.
3. Fabricate in accordance with SMACNA HVAC Duct Construction Standards, SMACNA Kitchen Ventilation Systems and Food Service Equipment Fabrication & Installation Guidelines and NFPA 96.

E. General Exhaust: 1 inch w.g. pressure class, galvanized steel.

F. Combustion Air: 1 inch w.g. pressure class, galvanized steel.

G. Provide air foil turning vanes when rectangular elbows must be used.

H. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

I. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.

J. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

D. Install and seal metal and flexible ducts in accordance with SMACNA (DCS) HVAC Duct Construction Standards – Metal and Flexible.

E. Install fibrous glass ducts in accordance with SMACNA Fibrous Glass Duct Construction Standards. Obtain manufacturer’s inspection and acceptance of fabrication and installation at beginning of installation.

F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

I. Connect terminal units to supply ducts directly or with one foot maximum length of flexible duct. Do not use flexible duct to change direction.

J. Connect diffusers or light troffer boots to low pressure ducts with 5 feet maximum length of flexible duct held in places with strap or clamp.

K. Connect flexible ducts to metal ducts with draw bands.

3.02 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.03 SCHEDULES

A. Ductwork Material:
1. Low Pressure Supply (Heating Systems): Steel.
2. Low Pressure Supply (System with Cooling Coils): Steel.
3. Return and Relief: Steel.
4. General Exhaust: Steel.
5. Outside Air Intake: Steel.

B. Ductwork Pressure Class:

1. Supply (Heating Systems): Low pressure up to 2 inch.
2. Supply (System with Cooling Coils): Low pressure up to 2 inch.
3. Return and Relief: Low pressure up to 2 inch.
4. General Exhaust: Low pressure up to 2 inch.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air turning devices/extractors.

B. Backdraft dampers - metal.

C. Duct access doors.

D. Duct test holes.

E. Fire dampers.

F. Flexible duct connections.

G. Volume control dampers.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 31 00 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

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

B. NFPA 92 - Standard for Smoke-Control Systems; 2021 with Amendment.

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

D. UL 33 - Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.

E. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.

F. UL 555S - Standard for Leakage Rated Dampers for Use in Smoke Control Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS - METAL

A. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch 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 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards and as indicated.

2.04 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.05 FIRE DAMPERS

A. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

B. Ceiling Dampers: Galvanized steel, 22 gage frame and 16 gage flap, two layers 0.125 inch ceramic fiber on top side and one layer on bottom side for round flaps, with locking clip.

C. Horizontal Dampers: Galvanized steel, 22 gage frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

D. 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 1.0 inch pressure class ducts up to 12 inches in height.

E. Multiple Blade Dampers: 16 gage galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 x 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

F. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

2.06 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.
   1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
      a. Net Fabric Width: Approximately 2 inches wide.
   2. Metal: 3 inches wide, 24 gage thick galvanized steel.

C. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lbs per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

D. Maximum Installed Length: 14 inch.

2.07 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards and as indicated.

B. Splitter Dampers:
   1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
   2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
   3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.
   1. Blade: 24 gage, minimum.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
   1. Blade: 18 gage, minimum.

E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

F. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30 inches provide regulator at both ends.

2.08 MISCELLANEOUS PRODUCTS

A. Internal Strut End Plugs: Combination end-mounting and sealing plugs for metal conduit used as internal reinforcement struts for metal ducts; plug crimped inside conduit with outside gasketed washer seal.

B. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
   1. Thickness: 2 mils.
   2. High tack water based adhesive.
   3. UV stable light blue color.
   4. Elongation Before Break: 325 percent, minimum.

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) HVAC Duct Construction Standards. Refer to Section 23 31 00 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 for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 x 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 x 4 inch 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 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 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; see Section 22 05 48.

J. For fans developing static pressures of 5.0 inches and over, cover flexible connections with leaded vinyl sheet, held in place with metal straps.

K. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

L. Use splitter dampers only where indicated.

M. 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

SECTION 23 34 23
HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof exhausters.

B. Ceiling exhaust fans.

C. Kitchen hood upblast roof exhausters.

1.02 RELATED REQUIREMENTS

A. Section 23 33 00 - Air Duct Accessories: Backdraft dampers.

B. Division 26 - Electrical: Basic electrical requirements.

1.03 REFERENCE STANDARDS

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

B. AMCA 99 - Standards Handbook; 2016.

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

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

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

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

G. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

H. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2021.

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

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Fan Belts: One set for each individual fan.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 FIELD CONDITIONS

A. Permanent ventilators may not be used for ventilation during construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carnes Company, Inc: www.carnes.com.

B. Greenheck: www.greenheck.com.

C. Loren Cook Company: www.lorencook.com.

2.02 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.

B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

C. Sound Ratings: AMCA 301, tested to AMCA 300, and bearing AMCA Certified Sound Rating Seal.

D. Fabrication: Conform to AMCA 99.

E. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

G. Enclosed Safety Switches: Conform to NEMA EN 10250.

2.03 ROOF EXHAUSTERS

A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.

B. Roof Curb: Curb adapter to fit existing roof curb, field verify requirements prior to purchase.

C. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

D. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.

E. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.

F. Wheel:
   1. Constructed of aluminum
   2. Non-overloading, backward inclined centrifugal
   3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
   4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.

G. Motor refer to Part 20.5 Direct Drive EC Motors.

2.04 CABINET AND CEILING EXHAUST FANS

A. Centrifugal Fan Unit: direct driven with galvanized steel housing lined with acoustic insulation, resilient mounted motor, gravity backdraft damper in discharge.

B. Disconnect Switch: Cord and plug in housing for thermal overload protected motor.

C. Grille: Metal with white finish.

D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.05 DIRECT DRIVE EC MOTOR EXHAUSTERS

A. Manufacturers:
   1. Basis-Of-Design: "VARI-GREEN CONTROL – EC MOTOR" manufactured by Greenheck Fan Corporation: www.greenheck.com.
   2. Loren Cook Company: www.lorencook.com.
   3. PennBarry: www.pennbarry.com.
   4. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Motor to be an electronic commutation (EC) motor specifically designed for fan applications.
   1. AC induction type motors that are not acceptable:
      a. Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors.
   2. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and prewired to the specific voltage and phase.
   3. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
   4. Motor shall be speed controllable down to 20% of full speed (80% turndown).
   5. Speed shall be controlled by either a potentiometer dial mounted on the motor or by a 0-10 VDC signal.
   6. Motor shall be a minimum of 85% efficient at all speeds.

2.06 KITCHEN HOOD UPBLAST ROOF EXHAUSTERS

A. Direct Drive/Belt Drive Fan:
   1. Fan Wheel:
      a. Type: Non-overloading, backward inclined centrifugal.
      b. Material: Aluminum.
   2. Statically and dynamically balanced.
   3. Motors:
      a. Open drip-proof (ODP).
      b. Heavy duty ball bearing type.
      c. Mount on vibration isolators or resilient cradle mounts, out of air stream.
      d. Fully accessible for maintenance.
   4. Housing:
      a. Construct of heavy gage aluminum including curb cap, windband, and motor compartment.
      b. Rigid internal support structure.
      c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
      d. Construct drive frame assembly of heavy gage steel, mounted on vibration isolators.
      e. Provide breather tube for fresh air motor cooling and wiring.

B. 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.

C. Drive Assembly:
   1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
   2. Belts: Static free and oil resistant.
   3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
   4. Motor pulley adjustable for final system balancing.
   5. Readily accessible for maintenance.

D. Disconnect Switches:
   1. Factory mounted and wired.
   2. 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.
   3. Finish for Painted Steel Enclosures: Provide manufacturer's standard, factory applied grey.
   4. Positive electrical shutoff.
   5. Wired from fan motor to junction box installed within motor compartment.

E. Roof Curb: 24 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, insulation and curb bottom, curb bottom, ventilated double wall, factory installed nailer strip.

F. Drain Trough: Allows for single-point drainage of water, grease, and other residues.

G. Options/Accessories:
   1. Automatic Belt Tensioner: Automatic device that adjusts for correct belt tension for single drives.
   2. Birdscreen:
      a. Provide galvanized steel construction.
      b. Protects fan discharge.
   3. Clean Out Port: Removable grease repellent compression rubber plug allows access for cleaning wheel through windband.

4. Roof Curb Extension: Vented curb extension where required for compliance with minimum clearances required by NFPA 96.
5. Drain Connection:
    a. Aluminum construction.
    b. Allows single-point drainage of grease, water, or other residues.
6. Finishes: Factory primed.
7. Grease Trap:
    a. Aluminum.
    b. Includes drain connection.
    c. Collects grease residue.
8. Hinge Kit:
    a. Aluminum hinges.
    b. Hinges and restraint cables mounted to base (sleeve).
    c. Allows fan to tilt away for access to wheel and ductwork for inspection and cleaning.
9. Heat Baffle: Prevents heat from radiating into motor compartment.
10. Tie-down Points: Four brackets located on windband secures fan in heavy wind applications.
11. External motor speed controllers for field mounting.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.

C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

D. Hung Cabinet Fans:
    1. Install flexible connection between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

E. Provide sheaves required for final air balance.

F. Install backdraft dampers on inlet to roof exhausters.

G. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

3.02 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Diffusers.

B. Registers/grilles.

C. Roof hoods.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coating: Painting of ducts visible behind outlets and inlets.

B. Section 23 31 00 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012 with Editorial Revision (2015).

B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2026 (Reaffirmed 2021).

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

1.04 SUBMITTALS

A. See Construction Manager's General 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.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of experience.

B. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

C. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carnes Company HVAC: www.carnes.com.

B. Greenheck Fan Corporation: www.greenheck.com.

C. Loren Cook Company: www.lorencook.com.

D. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.02 RECTANGULAR CEILING DIFFUSERS

A. Type: Provide square a, adjustable pattern diffuser to discharge air in four way pattern.

B. Connections: As scheduled on drawings.

C. Frame: Provide surface mount and inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame.

D. Fabrication: Steel with baked enamel finish.

E. Color: As shown on drawings.

2.03 CEILING SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, one-way deflection.

B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

C. Construction: Made of aluminum extrusions with factory enamel finish.

D. Color: As shown on drawings.

E. Color: As selected by Design Professional from manufacturer's standard range.

F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.04 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

B. Frame: 1-1/4 inch margin with countersunk screw mounting.

C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: As shown on the drawings.

E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

2.05 CEILING EGG CRATE EXHAUST AND RETURN GRILLES

A. Type: Egg crate style face consisting of 1/2 x 1/2 x 1/2 inch grid core.

B. Fabrication: Grid core consists of aluminum with mill aluminum finish.

C. Color: As shown on the drawings

D. Frame: 1-1/4 inch margin with countersunk screw mounting.

E. Frame: Channel lay-in frame for suspended grid ceilings.

2.06 WALL SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, single deflection.

B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: As shown on the drawings.

E. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.07 ROOF HOODS

A. Fabricate air inlet or exhaust hoods in accordance with SMACNA HVAC Duct Construction Standards.

B. Fabricate of galvanized steel, minimum 16 gage base and 20 gage hood, or aluminum, minimum 16 gage base and 18 gage hood; suitably reinforced; with removable hood; birdscreen with 1/2 inch square mesh for exhaust and 3/4 inch for intake, and factory prime coat finish.

C. Provide with backdraft dampers.

D. Fabricate louver penthouses with mitered corners and reinforce with structural angles.

E. Mount unit on minimum 12 inch high curb base with insulation between duct and curb.

F. Make hood outlet area minimum of twice throat area.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 90 00.

3.02 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 23 38 13
COMMERCIAL-KITCHEN HOODS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cooking hoods.

1.02 RELATED REQUIREMENTS

A. Section 22 10 06 - Plumbing Piping Specialties: Floor drains for indirect discharge.

B. Section 23 31 00 - HVAC Ducts and Casings: Exhaust and make-up air ducts.

C. Division 26 - Electrical: Electrical shut off switches or contactors for fans and electrical cooking equipment.

1.03 REFERENCE STANDARDS

A. ASSE 1001 - Performance Requirements for Atmospheric Type Vacuum Breakers; 2021.

B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

C. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2021.

D. NSF 2 - Food Equipment; 2025.

E. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.

F. UL 710 - Standard for Safety for Exhaust Hoods for Commercial Cooking Equipment; Current Edition, Including All Revisions.

G. UL 1046 - Standard for Grease Filters for Exhaust Ducts; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager's General 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. Installation instructions, adjusting and balancing methods.

C. Shop Drawings: For each custom fabricated unit, provide drawings showing details of construction, dimensions, and interfaces with adjacent construction.

D. Test Reports for Grease Extracting Hoods: Provide test reports substantiating exhaust volume ratings and grease extraction performance.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. At least five years experience in the design and manufacture of products of similar type to those specified.
   2. For grease extracting hoods, able to provide test data showing performance of hoods to be provided.
   3. Able to provide service to project site within 24 hours after receiving a service call.

PART 2 PRODUCTS

2.01 HOOD APPLICATIONS

A. Canopy-Style Cooking Hoods:
   1. Style: Wall-attached canopy.
   2. Mounting Height: Bottom rim at 78 inches above finished floor.

2.02 HOOD CONSTRUCTION

A. Provide products that comply with NFPA 96, the requirements and recommendations of SMACNA Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines, and the requirements of the authorities having jurisdiction.

B. Cooking Hoods: Provide Type I hoods, with all external joints and seams continuously welded, liquid-tight, and all internal joints, seams, and attachments sealed liquid-tight and grease-tight.
   1. Provide fire extinguishing system for all cooking hoods.
   2. Provide complete assemblies listed and labeled by UL under UL 710 for its intended use.
   3. Provide hoods and exhaust ducts rated for zero clearance to combustible construction.
   4. Provide complete assemblies certified and labeled by NSF under NSF 2.

C. Construction: All materials, inside and out, stainless steel complying with ASTM A666, Type 304, stretcher leveled; unless otherwise indicated.
   1. Sheet Thickness: 18 gage, 0.048 inch, minimum.
   2. Fabrication: Fabricate each individual hood in one piece, with all welds ground and finished to match (inside and out); fabricate flat surfaces exposed to view as double-pan formed panels with internal stiffener members.
   3. Finish on Surfaces Exposed to View: No.4 (brushed directional); provide stainless steel faces on all sides exposed to view.
   4. Finish on Concealed Surfaces: No.4 or No.2B (dull, matte).
   5. Multiple Hoods: Where total hood length in one run is over 12 feet, provide multiple hoods, complete in all respects, of the largest size available and of approximately equal length, mounted end to end.
      a. Provide junction boxes for field interconnection of wiring.
      b. Provide pre-drilled holes for field connections, with stainless steel fasteners; if field welding is necessary, grind and polish welds to match adjacent finish.
   6. Duct Collars: For exhaust and make-up air openings, provide duct collar welded to hood unit; minimum of 8 inches extension from top or back face of unit, with minimum one inch 90 degree flange, unless otherwise indicated.
   7. Access Panels: Provide removable or hinged access panels sufficient for maintenance and replacement of operating components inside unit; maximum width of 40 inches.
   8. Electrical: Run electrical wiring in conduit or raceways, factory pre-wired, with single connection point per hood.
   9. Supports: Stainless steel mounting brackets, struts, and threaded hanger rods.
      a. Hanger Rods: 3/8 inch diameter, minimum.
      b. Hanger Spacing: 48 inches on center, maximum.
      c. Attachment to Structure: Mechanical fittings or inserts, stainless steel.
   10. Accessory Panels: Where indicated, provide filler and closure panels of same construction as hoods, to close spaces between hoods and adjacent construction; mount with panel face flush with face of hood.
      a. Where top of ceiling hung hood is lower than the finished ceiling, provide panels to close space between top of hood and ceiling.
      b. Where back of hood must be set away from wall, provide filler panels to close space between hood and wall.

D. Exhaust Air Volume Control: For balancing; provide either built-in volume control damper or separate damper in exhaust duct.

E. Make-Up Air System: Provide volume damper at inlet, accessible for balancing.
   1. Diffusers: Louvered register with opposed blade dampers.
   2. Plenum: Insulated with one inch thick foil-face fiberglass insulation, on inside of plenum.

2.03 HOOD ACCESSORIES

A. Fire Extinguishing System: Comply with NFPA 96 and UL 300.
   1. Type: Wet-chemical type (Based on Ansul R-102).
   2. Exposed Piping Under Hood: Stainless steel or chrome plated.
   3. Exposed Piping Outside Hood: Stainless steel or chrome plated.
   4. Nozzles: Stainless steel or chrome plated brass.
   5. Electrical Components: Provide all components required for properly operating system, including but not limited to wiring, raceways, contactors, circuit breakers, switches and solenoids.
   6. Fire Alarm System: Provide connection point for building fire alarm system capable of signaling system readiness and to generate signal when system is actuated.
   7. Manual Actuators: Wall-mounted pull stations; provide one near each hood and one near exit door.

8. Lights Inside Hoods: Fluorescent and incandescent in quantity and locations indicated, in UL listed vapor-proof fixtures, pre-wired to junction box on top of hood.
    a. Incandescent: Surface mounted, thermal shock proof glass globe with chrome plated steel wire guard; 100 watt bulb.
    b. Locate switch for operating lights lower corner of face of hood.
9. Grease Filters: Stainless steel, washable, complying with UL 1046, UL listed and labeled;
10. Exhaust Ducts: 18 gage, 0.048 inch stainless steel sheet, ASTM A666; with external seams welded continuously, liquid-tight; see drawings for extent, location, and size of exhaust ducts.
    a. Where ducts penetrate ceilings or walls, provide stainless steel angle flange trim with welded corners, 16 gage, 0.06 inch minimum thickness.
    b. Where ducts penetrate hood body, provide stainless steel angle flange trim with welded corners and seal joints liquid-tight.
11. Fans: Provide manual controls for starting and stopping fans and labeled indicator lights showing fan status.
12. Fans: Provide controls for fan operation by time clock, programmable by the week, capable of maintaining time cycle after operation of manual push buttons.
13. Hoods with Supply Air Fan: Delay starting of exhaust fan for 5 seconds after start of supply fan.
14. Cooking Equipment: Provide manual shutoff and reset button located where indicated; combine with fire extinguishing actuation.
15. Fire Extinguishing System: Provide automatic actuation complying with NFPA 96; provide local and remote manual actuating stations clearly labeled "Hood Fire Protection"; upon actuation of fire extinguishing system, automatically:
    a. Shut off fans serving that hood.
    b. Shut off fuel source to equipment under hood; actuate solenoid gas valves provided as part of gas piping work.
    c. Shut off electric power to equipment under hood; actuate contactors or switches provided as part of electrical work.
    d. Signal building fire alarm system; normally-open contacts.

B. Controls:
1. Temperature Interlock:
    a. International Mechanical Code (IMC) 2006 section 507.2.1.1 Compliant Electrical Package.
    b. Basis-Of-Design: Greenheck Temperature Interlock electrical package as shown on plans and in accordance with the following specification:
    c. The Temperature Interlock(s) shall be U.L. 710 Listed and consist of an adjustable thermostat, junction box, Evergreen threaded fitting, and shall be a self contained unit or as part of another pre-engineered electrical control package.
    d. Hood systems should always be turned on manually before cooking equipment is turned on. The temperature interlock is intended as a backup system and the auto on feature should only be utilized when the fans are forgotten to be turned on. The Temperature Interlock package shall close a relay powering the fans when the set temperature is reached at the thermostat. The Interlock shall hold the circuit open upon fan switch being turned off until the temperature at the sensor decreases below the set point at which point an integral timer will begin a countdown. Once time has expired on the countdown with temperature staying below the thermostat set point, the fans shall shut down.
    e. In the event that the cooking equipment is started without the fans being manually turned on, the fans shall automatically activate and remain running with the presence of heat under the hood. The exhaust duct thermostat shall open after the temperature at the thermostat has dropped below the set point at which point the integral timer will begin it's countdown. Once time has expired on the countdown with temperature staying below the thermostat set point, the fans shall shut down.

C. Control Panels: Factory assembled and pre-wired, ready for utility connections.
1. UL listed for use with specific hood.
2. Provide a single control panel combining all control functions for a particular hood, unless otherwise indicated.
3. Provide a single control panel for each group of hoods served by a single exhaust fan.

4. Enclosures: Flush-mounted; stainless steel, to match hood.
5. Provide indicator lights on control panel door showing status of fans and power supply.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that overhead supports are installed in correct locations.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Design Professional of unsatisfactory preparation before proceeding.

3.02 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.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and NFPA 96.

B. Install hoods level and plumb, securely fastened, with seismic restraints as specified, and free of vibration during normal operation.

C. Weld hood duct collars to ductwork, liquid-tight.

D. Connect to utilities.

3.04 SYSTEM STARTUP

A. Obtain the services of the manufacturer's representative experienced in the installation, adjustment, and operation of the equipment to supervise the starting and adjusting of equipment.

B. Prepare equipment for startup, start and operate equipment for sufficient period to verify proper operation; correct equipment not operating correctly.

C. Test liquid carrying components for leaks.

D. Adjust volume dampers as required for proper air flow after building air handling systems have been balanced and adjusted.

E. Demonstrate operation to Owner's designated personnel.

F. Demonstrate operation to authorities having jurisdiction if required by them; comply with their requirements for demonstration.

G. Report deficiencies in writing to Design Professional.

3.05 CLOSEOUT ACTIVITIES

A. Conduct training of Owner's designated personnel in the operation and maintenance of equipment.

B. Perform at least 2 hours of training, for minimum of 2 people, at project site.

C. Arrange training sessions with Owner at least 2 weeks in advance.

D. Have operation and maintenance data on hand for training sessions.

3.06 CLEANING

A. Clean surfaces of equipment.

3.07 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 23 52 16

CONDENSING BOILERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Boilers.

B. Controls and boiler trim.

C. Indoor/outdoor reset controller.

D. Hot water connections.

E. Fuel burning system and connection.

F. Chimney connection.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 23 21 13 - Hydronic Piping.

C. Section 23 21 14 - Hydronic Specialties.

D. Section 23 21 23 - Hydronic Pumps.

E. Division 26 - Electrical: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers; 2022.

B. ASME BPVC-IV) - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2023.

C. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

D. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2021.

1.04 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section, including Construction Manager's General Requirements Sections.

1.05 SUBMITTALS

A. Product Data: Include performance data, operating characteristics, furnished specialties and accessories.
   1. Prior to flue vent installation, engineered calculations and drawings must be submitted to Architect/Engineer to thoroughly demonstrate that size and configuration conform to recommended size, length and footprint for each submitted boiler.

B. Efficiency Curves: At a minimum, submit efficiency curves for 100%, 50% and 7% input firing rates at incoming water temperatures ranging from 80°F to 160°.

C. Pressure Drop Curve. Submit pressure drop curve for the following flow ranges per designated capacities below:
   1. 750-1000 MBH: 12-175 GPM

D. Shop Drawings: For boilers, boiler trim and accessories include:
   1. Plans, elevations, sections, details and attachments to other work
   2. Wiring Diagrams for power, signal and control wiring

E. Source Quality Control Test Reports: Reports shall be included in submittals.

F. Field Quality Control Test Reports: Reports shall be included in submittals.

G. Operation and Maintenance Data: Data to be included in boiler emergency, operation and maintenance manuals.

H. Warranty: Standard warranty specified in this Section

I. Other Informational Submittals:

1. ASME Stamp Certification and Report: Submit "H" stamp certificate of authorization, as required by authorities having jurisdiction, and document hydrostatic testing of piping external to boiler.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: The manufacturer must have been regularly engaged in the manufacture of condensing hydronic boilers for not less than thirty (30) years. The manufacturer must be headquartered in North America and manufacture pressure vessels in an ASME-certified facility wholly owned by the manufacturer. The specifying engineer, contractor and end customer must have the option to visit the factory to witness test fire and other relevant procedures

B. Electrical Components, Devices and Accessories: Boilers must be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. AHRI Performance Compliance: Condensing boilers must be rated in accordance with applicable federal testing methods and is capable of achieving the energy efficiency and performance ratings within prescribed tolerances.

D. ASME Compliance: Condensing boilers must be constructed in accordance with ASME Boiler and Pressure Vessel Code, Section IV “Heating Boilers”.

E. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."

F. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."

G. UL Compliance: Boilers must be tested for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

H. NOx Emission Standards: When installed and operated in accordance with manufacturer’s instructions, the following condensing boiler models shall comply with the NOx emission standards outlined in South Coast Air Quality Management District (SCAQMD), Rule 1146.1; and the Texas Commission on Environmental Quality (TCEQ), Title 30, Chapter 117, and Rule 117.465 or the NOx emissions referenced below:
   1. BMK750-2000: 9 ppm NOx corrected to 3% oxygen at all firing rates when firing on natural gas.

1.07 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.08 WARRANTY

A. Standard Warranty: Boilers shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
   1. Warranty Period for Fire-Tube Condensing Boilers
      a. The pressure vessel/heat exchanger shall carry a 10-year from shipment, non-prorated, limited warranty against any failure due to condensate corrosion, thermal stress, mechanical defects or workmanship.
      b. The pressure vessel is warranted against failure due to thermal shock for 20 years from date of shipment.
      c. The burner shall be conditionally guaranteed against any failure for (5) years from shipment.
      d. Manufacturer labeled control panels are conditionally warranted against failure for (2) two years from shipment.
      e. All other components, with the exception of the igniter, flame detector and O_2 sensor, are conditionally guaranteed against any failure for (18) eighteen months from shipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. This specification is based on the Benchmark Standard Series boilers as manufactured by AERCO International Inc. Equivalent units and manufacturers must meet all performance criteria, and will be considered upon prior approval.

B. Basis-of-Design Product: Subject to compliance with requirements, provide AERCO International, Benchmark Series Boiler Models:
   1. BMK 1500
   2. Approved Equals:
      a. AERCO Benchmark boilers BMK
      b. Bosch Buderus SB Series
      c. Superior Boiler - Creek Series
      d. Request for substitutions will be considered in accordance with provisions of Section 235216 - Condensing Boilers, in writing no less than 30 days prior to bid date.
         Note: Water tube boilers are not permitted without written approval. Request and written approval must be submitted and obtained 14 days prior to bid date.

2.02 CONSTRUCTION

A. Description: Boiler shall be either natural gas fired, fully condensing, fire tube design. Power burner shall have full modulation, discharge into a positive or negative pressure vent and the minimum firing rate shall not exceed the following per model:
   1. BMK1500: 150,000 BTU/hr input .
   2. Boilers that have an input greater than what is specified above at minimum fire will not be considered.
   3. Boiler efficiency shall increase with decreasing load (output), while maintaining setpoint. Boiler shall be factory-fabricated, factory-assembled and factory-tested, fire-tube condensing boiler with heat exchanger sealed pressure-tight, built on a steel base, including insulated jacket, flue-gas vent, combustion-air intake connections, water supply, return and condensate drain connections, and controls.

B. Heat Exchanger: The heat exchanger shall be constructed of 439 stainless steel fire tubes and tubesheets, with a one-pass combustion gas flow design. The fire tubes shall be 1/2” or 5/8” OD, with no less than 0.049” wall thickness. The upper and lower stainless steel tubesheet shall be no less than 0.25” thick. The pressure vessel/heat exchanger shall be welded construction. The heat exchanger shall be ASME stamped for a working pressure not less than 150 psig. Access to the tubesheets and heat exchanger shall be available by burner and exhaust manifold removal. Minimum access opening shall be no less than 8-inch diameter.

C. Pressure Vessel: The pressure vessel shall have a maximum water volume per each model as listed below:
   1. BMK1500: 44 gallons (166.6 liters).
   2. The boiler water pressure drop shall not exceed the following: 3 psig @ 170 gpm.
   3. The boiler water connections shall be flanged 150-pound, ANSI rated.
   4. BMK1500 - 3000: 4 inch flange.
   5. The pressure vessel shall be constructed of ASME SA53 carbon steel, with a 0.25-inch thick wall and 0.50-inch thick upper head. Inspection openings in the pressure vessel shall be in accordance with ASME Section IV pressure vessel code. The boiler shall be designed so that the thermal efficiency increases as the boiler firing rate decreases.

D. Modulating Air/Fuel Valve and Burner: The boiler burner shall be capable of the following firing turndown ratios without loss of combustion efficiency or staging of gas valves. The turndown ratios shall be as follows and are based on BTU size:
   1. BMK1500: 20:1.
      a. The burner shall not operate above 7.5% oxygen level or 55% excess air. The burner shall produce less than 20 ppm of NOx, under standard calibration, corrected to 3% excess oxygen when firing on natural gas. The burner shall be metal-fiber mesh covering a stainless steel body with spark or proven pilot ignition and flame rectification. All burner material exposed to the combustion zone shall be of stainless steel construction. There shall be no moving parts within the burner itself. A modulating air/fuel valve shall meter the air and fuel input. The modulating motor must be linked to both the gas valve body and air valve body with a single linkage. The linkage shall not require any field adjustment. A variable speed cast aluminum pre-mix blower shall be used to ensure the optimum mixing of air and fuel between the air/fuel valve and the burner.

E. Fuel - The boiler shall use one of the following gas train options:
   1. Natural gas or propane: The unit gas train shall be specifically designed and calibrated for a single predetermined fuel. The gas train shall be a ventless gas train.

2. Dual Fuel Capability: Dual fuel boiler (natural gas/propane) shall include a combustion system capable of operating on both Natural Gas and Propane. The boiler efficiency and turndown shall remain unchanged regardless of fuel source. The dual fuel system shall incorporate independent natural gas and propane gas trains and a fuel selector switch. This switching mechanism shall be such that it shall not be possible to flow both fuels simultaneously. The unit shall be calibrated to run on both fuel sources at start-up. No additional re-calibration shall be required when switching between fuel sources for a period of one year from the initial calibration.

F. Minimum boiler efficiencies shall be as follows at a 20-degree delta-T:

EWT	100% Fire	50% Fire	7% Fire
160 °F	86.5%	87%	87%
140 °F	87%	87.5%	87.5%
120 °F	88.5%	89%	90%
100 °F	93.2%	94.5%	95.2%
80 °F	95.6%	96.8%	98.2%

G. Exhaust Manifold: The exhaust manifold shall be of corrosion resistant cast aluminum or 316 stainless steel with the following diameter flue connections:
   1. BMK750-1500: 6 inch.
   2. The exhaust manifold shall have a collecting reservoir and a gravity drain for the elimination of condensation.

H. Blower: The boiler shall include a variable-speed, DC centrifugal fan to operate during the burner firing sequence and pre-purge the combustion chamber.
   1. Motors: Blower motors shall comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
      a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require a motor to operate in the service factor range above 1.0.

I. Ignition: Ignition shall be via spark or proven pilot ignition with 100 percent main-valve shutoff and electronic flame supervision.

J. Combustion Air Filter: The boiler shall be equipped with an automotive high flow air filter to ensure efficient combustion and unhindered burner components operation.

K. Enclosure: The plastic and sheet metal enclosure shall be fully removable, allowing for easy access during servicing.

2.03 CONTROLS

A. Refer to Division 23 09 01 and 23 09 02 , Building Management and Control System and Control Sequences for boiler integration requirements.

B. The boiler shall have an integrated boiler control that provides contact closure for its associated accessories including but not limited to pump, valve and air inlet damper.
   1. The control shall have a 5 inch color touch screen display as well as six function buttons that are separate from the display. User shall have the ability to navigate the menus via touchscreen or navigation buttons. fControls not equipped with navigation button options shall not be permitted.
   2. The control shall be equipped with a multi-color linear LED light to indicate the level of firing and/or air/fuel valve position.
   3. The control shall display two temperatures using two dedicated three-digit seven-segment displays.
   4. The control shall offer an Enable/Disable toggle switch as well as two buttons for Testing and Resetting the Low Water Cutoff.

C. The Manager designated boiler control shall be capable of the following functions without the need for additional external controls:
   1. Sequence up to 16 boilers,
   2. Control boiler pumps and/or modulating motorized valves,
   3. Building Automation: The control shall be able to communicate to Building Management Systems using RS485 and communicate using Modbus RTU protocol.

D. The control system shall be segregated into three components: Edge [i] Control Panel, Power Panel and Input/Output Connection Box. The entire system shall be Underwriters Laboratories recognized.

E. The control panel shall consist of seven individual circuit boards using surface-mount technology in a single enclosure. Each board shall be individually field replaceable. These circuit boards shall include:
   1. A microcontroller board with integrated 5 inch touchscreen color display providing the user interface.
   2. A 7-segment display board. This board includes two 3-digit 7-segment displays. These displays shall be used to view a variety of temperature sensor values and operating and startup function status.
   3. An Interface board connects the microcontroller board to internal components using ribbon cables.
   4. An electric low-water cutoff board connects to the test and manual reset functions on the microcontroller board.
   5. A power supply board is designed to provide the different DC voltages to the rest of the boards. It also acts as voltage regulator and reduce power noise.
   6. An ignition and combustion board. This board controls the air/fuel valve and Safety Shutoff Valve, flame status and ignition transformer.
   7. A connector board used to connect all external electrical connection.

F. Control settings transfer using USB: The control shall simplify and significantly lessen startup and boiler setting time by being able to use a USB flash drive to copy settings from one boiler to another boiler. Installers shall use successfully preconfigured boiler settings in their portfolio to newly installed boilers.

G. Combustion calibration: The control shall offer at least 5 calibration points. The use of less than 5 calibration points is not permitted to improve overall system efficiency under all firing rates. Each combustion calibration point shall operate with 5 to 7% O_2 levels to improve operating efficiency. Deviating away from these values shall not be acceptable.

H. Unit and Plant Status: The control shall provide a quick view of the unit status and plant status.
   1. The unit status screen shall provide temperature setpoint, all water inlet and outlet and supply air and exhaust temperature sensors' values. It shall also provide unit current and target firing rates. Additional screens shall display unit run hours, cycle count and average cycles per hour.
   2. The plant status screens shall provide plant temperature setpoint, plant water supply and return temperatures, outdoor temperature. Additionally, a status screen shall show the boiler status of each plant unit, plant firing rate.
   3. Unit and Plant event history: The manager control shall display the last 500 historical events per plant or 200 historical events for single unit installations.

I. Software Update: The control shall be capable of field software updates without a need for hardware component(s) replacement. This shall be performed either using software on a USB flash drive or via Internet connection. The software update mechanism shall be performed by a trained technician. The software update menus shall be secured using a password level. After the software update, the control shall retain all of its prior field settings.

J. Copy settings from one boiler to the other: To significantly reduce installation time by reducing long repetitive work, the control shall have the capability of saving its settings to a USB flash drive. In addition, the control shall have the ability of copying new settings from a flash drive.

K. The controls shall annunciate boiler and sensor status and include extensive self-diagnostic capabilities.

L. The control panel shall incorporate three self-governing features designed to enhance operation in external control modes. When operating by an external control signal, the control panel can work to eliminate nuisance faults, such as over-temperature, resulting from improper external signal or loss of external signal. These features include:
   1. Setpoint High Limit: Setpoint high limit allows for a selectable maximum boiler outlet temperature and acts as temperature limiting governor. Setpoint limit is based on a PID function that automatically limits firing rate to maintain outlet temperature within a 0 to 10 degree selectable band from the desired maximum boiler outlet temperature.
   2. Setpoint Low Limit: Allow for a selectable minimum operating temperature.
   3. Failsafe Mode: Failsafe mode allows the boiler to switch its mode to operate from an internal setpoint if its external control signal is lost, rather than shut off. This is a selectable mode, enabling the control to shut off the unit upon loss of external signal, if so desired.

M. The boiler control system shall incorporate the following additional features for enhanced external system interface:
   1. System start temperature feature.
   2. Pump delay timer.
   3. Remote interlock circuit.
   4. Delayed interlock circuit.
   5. Delta-T Limiter.
   6. Freeze protection.
   7. Fault relay for remote fault alarm.
   8. Warm-weather shutdown.
   9. The control shall offer multi-level user security access using different passwords. For additional security, the passwords shall expire if control display was not touched for an extended period 30 minutes.

N. Each boiler shall include an electric, single-seated combination safety shutoff valve/regulator with proof of closure switch in its gas train. Each boiler shall incorporate dual over-temperature protection with manual reset, in accordance with ASME Section IV and CSD-1.

O. Each boiler shall be equipped with TComp™ combustion air temperature compensation. If the combustion air temperature changes, the control system will automatically compensate for air density changes by adjusting the blower speed. This will adjust oxygen and optimize the combustion efficiency under all seasonal temperature changes. Boilers without air temperature compensation shall be deemed unacceptable.

P. Each boiler shall be onAER ready with a standard Ethernet port and include a 5 year onAER subscription at no additional charge. AERCO's onAER service grants the user online access to real time operation and status of their system plant from any computer, tablet or mobile device along with the following capabilities:
   1. Efficiency status and trends.
   2. Efficiency and performance optimization tips.
   3. Preventative Maintenance alerts and scheduling.
   4. Predictive Maintenance algorithms.
   5. Warning and error messages.
   6. Weekly or monthly performance and status reports.
   7. Manage multiple boiler plants or buildings.
   8. Customizable dashboard.
   9. Add email contacts for alerts and reports, including local AERCO trained technicians.
   10. Manage and store startup, maintenance and service documentation.
   11. The boiler manufacturer shall be able to provide a network hub or a network switch to connect up 16 boilers to an online network.

Q. Each boiler shall have integrated Boiler Sequencing Technology (BST), capable of multi-unit sequencing with lead-lag functionality and parallel operation. The system will incorporate the following capabilities:
   1. Efficiently sequence 2 to 16 units on the same system to meet load requirement.
   2. Integrated control and wiring for seamless installation of optional isolation valve. When valves are utilized, the system shall operate one motorized valve per unit as an element of load sequencing. Valves shall close with decreased load as units turn off, with all opening under no-load conditions.
   3. Automatically rotate lead/lag amongst the units on the chain and monitor run hours per unit and balance load in an effort to equalize run hours among active units.
   4. Option to manually designate lead and last boiler.
   5. Designated manager control, used to display and adjust key system parameters.
   6. Automatic bump-less transfer of manager function to next unit on the chain in case of designated manager unit failure; manager/client status should be shown on the individual unit displays.

R. The ACS shall have the following anti-cycling features:
   1. Manual designation of lead boiler and last boiler.
   2. Lead boiler rotation at user-specified time interval.
   3. Delay the firing/shutting down of boilers when header temperature within a predefined deadband.
   4. When set on Internal Setpoint Mode, temperature control setpoint on the ACS shall be fully field adjustable from 50ºF to 190ºF in operation. When set on Indoor/Outdoor Reset Mode, the ACS will

operate on an adjustable inverse ratio in response to outdoor temperature to control the main header temperature. Reset ratio shall be fully field adjustable from 0.3 to 3.0 in operation. When set on 4ma to 20ma Temperature Control Mode, the ACS will operate the plant to vary header temperature set-point linearly as an externally applied 4-20 ma signal is supplied.

5. When set on MODBUS Temperature Control Mode, the ACS will operate the plant to vary header temperature setpoint as an external communication utilizing the MODBUS protocol is supplied via the RS-232 port. The ACS controller shall have a vacuum fluorescent display for monitoring of all sensors and interlocks. Non-volatile memory backup of all control parameters shall be internally provided as standard. The controller will automatically balance the sequence of operating time on each boiler by a first-on first-off mode and provide for setback and remote alarm contacts. Connection between central ACS system and individual boilers shall be twisted pair low voltage wiring, with the boilers 'daisy-chained' for ease of installation.

2.04 ELECTRICAL POWER

A. Controllers, Electrical Devices and Wiring: Electrical devices and connections are specified in Division 26 sections.

B. Single-Point Field Power Connection: Factory-installed and factory-wired switches, motor controllers, transformers and other electrical devices shall provide a single-point field power connection to the boiler.

C. Electrical Characteristics:
   1. 120V-1 phase, 60Hz, Full Load Current 13-26 amps.

2.05 VENTING

A. The exhaust vent must be UL Listed for use with Category II, III and IV appliances and compatible with operating temperatures up to 230°F, condensing flue gas service. UL-listed vents of Polypropylene and Al 29-4C stainless steel must be used with boilers.
   1. PVC/CPVC is approved for use with BMK750-1000 models

B. The minimum exhaust vent duct size for each boiler is six-inch (BMK750-1500).

C. Combustion-Air Intake: Boilers shall be capable of drawing combustion air from the outdoors via a PVC duct connected between the boiler and the outdoors.

D. The minimum ducted combustion air duct size for each boiler is six-inch (BMK750-1500),

E. Common vent and common combustion air must be an available option for boiler installation. Consult manufacturer for common vent and combustion air sizing.

F. Follow guidelines specified in manufacturer's venting guide.

2.06 SOURCE QUALITY CONTROL

A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions and carbon monoxide in flue gas, and to achieve combustion efficiency. Perform hydrostatic testing.

B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.
   1. If boilers are not factory assembled and fire-tested, the local vendor is responsible for all field assembly and testing.

C. Allow Owner access to source quality-control testing of boilers. Notify Architect fourteen days in advance of testing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Before boiler installation examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations and piping and electrical connections to verify actual locations, sizes and other conditions affecting boiler performance, maintenance and operations.
   1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 BOILER INSTALLATION

A. Install boilers level on concrete bases. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.

B. Install gas-fired boilers according to NFPA 54.

C. Assemble and install boiler trim.

D. Install electrical devices furnished with boiler but not specified to be factory mounted.

E. Install control wiring to field-mounted electrical devices.

3.03 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 sections. Drawings indicate general arrangement of piping, fittings and specialties.

B. Install piping adjacent to boiler to permit service and maintenance.

C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.

D. Connect gas piping to boiler gas-train inlet with unions. Piping shall be at least full size of gas train connection. Provide a reducer if required.

E. Connect hot-water piping to supply and return boiler tappings with shutoff valve and union or flange at each connection.

F. Install piping from safety relief valves to nearest floor drain.

G. Boiler Venting
   1. Install flue venting kit and combustion-air intake.
   2. Connect venting full size to boiler connections.

H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.04 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections
   1. Perform installation and startup checks according to manufacturer's written instructions.
   2. Perform hydrostatic test. Repair leaks and retest until no leaks exist.
   3. Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
      a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level and water temperature.
      b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Remove and replace malfunctioning units and retest as specified above.

D. Occupancy Adjustments: When requested within 2 months of date of Substantial Completion, provide on-site assistance adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

E. Performance Tests: The boiler manufacturer is expected to provide partial load thermal efficiency curves. These thermal efficiency curves must include at least three separate curves at various BTU input levels. If these curves are not available, it is the responsibility of the boiler manufacturer to complete the following performance tests:
   1. Engage a factory-authorized service representative to inspect component assemblies and equipment installations, including connections, and to conduct performance testing.
   2. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment to comply.
   3. Perform field performance tests to determine capacity and efficiency of boilers.
      a. Test for full capacity.

b. Test for boiler efficiency at [low fire, 20, 40, 60, 80, 100, 80, 60, 40 and 20] percent of full capacity. Determine efficiency at each test point.

4. Repeat tests until results comply with requirements indicated.
5. Provide analysis equipment required to determine performance.
6. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
7. Notify Architect in advance of test dates.
8. Document test results in a report and submit to Design Professional.

3.05 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install boiler and provide connection of natural gas service in accordance with requirements of NFPA 54 and applicable codes.

C. Install boiler on concrete housekeeping base, sized minimum 4 inches larger than boiler base. Refer to Section 03 30 00.

D. Pipe relief valves to nearest floor drain.

E. Provide for connection to electrical service and lockable switch at boiler. Refer to Division 26.

F. Provide and install emergency shut-off in room, adjacent to door, to comply with boiler code requirements.

G. Provide and install condensate trap and condensate neutralizer.

3.06 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

3.07 CLOSEOUT ACTIVITIES

A. Train operating personnel in operation and maintenance of units.

END OF SECTION

SECTION 23 63 13

AIR COOLED REFRIGERANT CONDENSERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refrigerant condenser package.

B. Controls and control connections.

C. Refrigerant piping and connections.

D. Electrical power connections.

1.02 RELATED REQUIREMENTS

A. Section 23 23 00 - Refrigerant Piping.

B. Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment; 2023.

B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2024, with Addendum (2026).

C. ASHRAE Std 20 - Methods of Testing for Rating Remote Mechanical-Draft Air Cooled Refrigerant Condensers; 2019.

D. 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.

E. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

F. UL 207 - Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.04 PERFORMANCE REQUIREMENTS

A. See Drawings for performance requirements

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide rated capacities, weights, accessories, electrical requirements, and wiring diagrams.

C. Shop Drawings: Indicate components, assembly, dimensions, weights and loading, required clearances, and location and size of field connections. Include schematic layouts showing condenser, refrigeration compressors, cooling coils, refrigerant piping and accessories required for complete system.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.

B. Protect units on site from physical damage. Protect coils.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Trane Inc: www.trane.com.

B. Daikin. www.daikin.com

C. Lennox: www.lennoxcommercial.com.

2.02 MANUFACTURED UNITS

A. Provide packaged, factory assembled, pre-wired unit, suitable for outdoor use consisting of casing, condensing coil and fans, integral sub-cooling coil liquid accumulator.

B. Construction and Ratings: In accordance with AHRI 210/240 and UL 207. Testing shall be in accordance with ASHRAE Std 20.

C. Performance Ratings: Energy Efficient Rating (EER)/Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1, in combination with compressor units.

2.03 CASING

A. House components in welded steel frame with steel panels with weather resistant, baked enamel finish.

B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.

C. Provide removable access doors or panels with quick fasteners.

D. Provide welded steel floor mounting stand and duct collars at coil inlet and fan outlet.

2.04 CONDENSER COILS

A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.

B. Coil Guard: Expanded metal with lint screens.

C. Configuration: Single refrigeration circuit with receiver.

2.05 FANS AND MOTORS

A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge, equipped with roller or ball bearings with grease fittings extended to outside of casing.

B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built-in current and thermal overload protection; refer to Section 23 05 13.

C. Horizontal discharge, double width, double inlet forward curved centrifugal type condenser fans, equipped with roller or ball bearings with grease fittings extended to outside of casing, V-belt drive with belt guard.

2.06 CONTROLS

A. Provide factory wired and mounted control panel, NEMA 250, containing fan motor starters, fan cycling thermostats, compressor interlock, and control transformer.

B. Provide thermostat to cycle fan motors in response to outdoor ambient temperature.

C. Provide head pressure switch to cycle fan motors in response to refrigerant condensing pressure.

D. Provide solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure.

E. Provide electronic low ambient control consisting of mixing damper assembly, controlled to maintain constant refrigerant condensing pressure.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide for connection to electrical service. Refer to Division 26 - Electrical.

C. Align condensers on concrete foundations. Refer to Section 03 30 00.

D. Provide connection to refrigeration piping system. Refer to Section 23 23 00. Comply with ASHRAE Std 15.

E. Provide cooling season start-up, winter season shut-down service, for first year of operation.

F. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

3.02 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 23 73 13

MODULAR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory fabricated assembly of modular sections consisting of housed centrifugal or plenum fans with belt or direct drives, coils, filters, and other necessary modules to perform one or more of the functions of circulating, cleaning, heating, cooling, humidification, dehumidification, and mixing of air with construction suitable for indoor or outdoor applications.

B. Roof mounting curbs.

1.02 RELATED REQUIREMENTS

A. Section 23 07 19 - HVAC Piping Insulation.

B. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

C. Division 26 - Electrical: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015 (Reaffirmed 2026).

B. ACGIH - Ultraviolet Radiation, TLV(R) Physical Agents 7th Edition Documentation, 2010.

C. AHRI 260 (I-P) - Sound Rating of Ducted Air Moving and Conditioning Equipment; 2017.

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

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

F. AHRI 1060 (I-P) - Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment; 2023.

G. AMCA 99 - Standards Handbook; 2016.

H. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; 2016.

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

J. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

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

L. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012, with Editorial Revision (2015).

M. AMCA 611 - Certified Ratings Program – Product Rating Manual for Airflow Measurement Stations; 2015.

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

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

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

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

R. ASTM E477 - Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers; 2020.

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

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

U. SMACNA (DCS) - HVAC Duct Construction Standards; 2021.

V. UL 153 - Portable Electric Luminaries; Current Edition, Including All Revisions.

W. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, including All Revisions.

X. UL 508 - Industrial Control Equipment; Current Edition, Including All Revisions.

Y. UL 795 - Commercial-Industrial Gas Heating Equipment; Current Edition, Including All Revisions.

Z. UL 1598 - Luminaires; Current Edition, Including All Revisions.

AA. UL 1812 - Ducted Heat Recovery Ventilators; Current Edition, Including All Revisions.

AB. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other trades for installation of roof mounted air handling units on roof curbs.

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: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data:
   1. Published Literature: Indicate dimensions, weights, capacities, ratings, gages and finishes of materials, and electrical characteristics and connection requirements.
   2. Filters: Data for filter media, filter performance data, filter assembly, and filter frames.
   3. Fans: Performance and fan curves with specified operating point clearly plotted, power, RPM.
   4. Sound Power Level Data: Fan outlet and casing radiation at rated capacity.
   5. Electrical Requirements: Power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

C. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, and electrical characteristics and connection requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.07 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.

B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

C. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Carrier Corporation: www.carrier.com.

B. Daikin Applied: www.daikinapplied.com.

C. Trane Inc: www.trane.com.

2.02 AIR-HANDLING UNIT

A. Components:
   1. Casing construction.
   2. Fan section.
   3. Coil section.
   4. Filter and air cleaner section.
   5. Damper section.

B. Fabrication: Conform to AMCA 99 and AHRI 430.

C. Performance: Sea level conditions:

1. See Schedule on drawings.

2.03 CASING CONSTRUCTION

A. Full Perimeter Base Rail:
   1. Construct of galvanized steel.
   2. Provide base rail of sufficient height to raise unit for external trapping of condensate drain pans.

B. Casing:
   1. Construct of one piece, insulated, double wall panels.
   2. Provide mid-span, no through metal, internal thermal break.
   3. Construct outer panels of galvanized steel and inner panels of galvanized steel.
   4. Casing Air Pressure Performance Requirements:
      a. Able to withstand up to 8 inches w.g. positive or negative static pressure.
      b. Not to exceed 0.0042 inches per inch deflection at 1.5 times design static pressure up to a maximum of plus 8 inches w.g. in all positive pressure sections and minus 8 inches w.g. in all negative pressure sections.

C. Access Doors:
   1. Construction, thermal and air pressure performance same as casing.
   2. Provide surface mounted handles on hinged, swing doors.
   3. Provide shatterproof viewing window designed to withstand operating pressures.

D. Unit Flooring: Construct with sufficient strength to support expected people and equipment loads associated with maintenance activities.

E. Casing Leakage: Seal all joints and provide airtight access doors so that air leakage does not exceed one percent of design flow at the specified casing pressure.

F. Insulation:
   1. Provide minimum thermal thickness of 12 R throughout.
   2. Completely fill all panel cavities in all directions preventing voids and settling.
   3. Comply with NFPA 90A.

G. Drain Pan Construction:
   1. Provide cooling coil and heating coil sections with an insulated, double wall, galvanized steel drain pan complying with ASHRAE 62.1 for indoor air quality and sufficiently sized to collect all condensate
   2. Slope in two planes to promote positive drainage and eliminate stagnate water conditions.
   3. Locate outlet of sufficient diameter at lowest point of pan to prevent overflow at normal operating conditions.
   4. Provide threaded drain connections constructed of drain pan material, extended sufficient distance beyond the base to accommodate field installed, condensate drain trapping.
   5. Indoor Units:
      a. Provide exterior, galvanized steel panels without paint.
      b. Provide exterior, galvanized steel panels with painted surface complying with ASTM B117.
      c. Color: Manufacturer's standard color.

2.04 FAN SECTION

A. Type: Forward curved, double width, double inlet, centrifugal plug type fan.

B. Performance Ratings: Determined in accordance with AMCA 210 and labeled with AMCA Certified Rating Seal.

C. Sound Ratings: AMCA 301; tested to AMCA 300 and label with AMCA Certified Sound Rating Seal.

D. Bearings: Self-aligning, grease lubricated, with lubrication fittings extended to exterior of casing with plastic tube and grease fitting rigidly attached to casing.

E. Mounting: Locate fan and motor internally on welded steel base coated with corrosion resistant paint. Factory mount motor on slide rails. Provide access to motor, drive, and bearings through removable casing panels or hinged access doors. Provide built-in inertia base of welded steel with bottom sheet and reinforcing grid for concrete ballast. Mount base on vibration isolators; refer to Section 23 05 48.

F. Mounting: Locate motor, drive, and belt guard on integral casing framework on exterior of casing. Provide ventilated weather cover of galvanized steel completely enclosing motor and drive with tachometer opening. Mount casing on vibration isolators; refer to Section 23 05 48.

G. External Motor Junction Box: Factory mount NEMA 4 external junction box and connect to extended motor leads from internally mounted motors.

H. Motor Wiring Conduit: Factory wire fan motor wiring to the unit mounted starter-disconnect, variable frequency drive, external motor junction box.

I. Flexible Duct Connections: For separating fan and coil, and adjacent sections; refer to Section 23 33 00.

J. Drives:
   1. Bearings: Heavy duty pillow block type, ball bearings, with ABMA 9 L-10 life at 50,000 hours.
   2. Shafts: Solid, hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
   3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts, and keyed. Variable and adjustable pitch sheaves for motors 15 hp and under selected so required rpm is obtained with sheaves set at mid-position; fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
   4. Belt Guard: Fabricate to SMACNA HVAC Duct Construction Standards; 0.106 inch thick, 3/4 inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

2.05 COIL SECTION

A. Casing: Provide access to both sides of coils. Enclose coils with headers and return bends exposed outside casing. Slide coils into casing through removable end panel with blank off sheets and sealing collars at connection penetrations.

B. Drain Pans: 24 inch downstream of coil and down spouts for cooling coil banks more than one coil high.

C. Eliminators: Three break of galvanized steel, mounted over drain pan.

D. Air Coils: Certify capacities, pressure drops, and selection procedures in accordance with AHRI 410. Refer to Section 23 82 00.

E. Fabrication:
   1. Tubes: 5/8 inch OD seamless copper expanded into fins, brazed joints.
   2. Fins: Aluminum.
   3. Casing: Die formed channel frame of galvanized steel.

F. Water Heating Coils:
   1. Headers: Cast iron, seamless copper tube, or prime coated steel pipe with brazed joints.
   2. Configuration: Drainable, with threaded plugs for drain and vent; serpentine type with return bends on smaller sizes and return headers on larger sizes.

G. Refrigerant Coils:
   1. Headers: Seamless copper tubes with silver brazed joints.
   2. Liquid Distributors: Brass or copper venturi distributor with seamless copper distributor tubes.
   3. Configuration: Down feed with bottom suction.

H. Hot Water Heating Coil:
   1. See Schedule on drawings.

I. Refrigerant Cooling Coil:
   1. See Schedule on drawings.

2.06 FILTER AND AIR CLEANER SECTION

A. General: Provide filter sections with filter racks, minimum of one access door for filter removal, and filter block-offs to prevent air bypass.

B. Hi-Efficiency Filters:
   1. Media: 2 inch prefilter and 4 inch closely spaced, pleated, fine fiber, hi-efficiency filter, sealed into a rigid frame, and capable of operating up to a maximum of 625 fpm without loss of efficiency and holding capacity.

2. Filter Rack: Side-access designed to hold rigid frames.
3. Minimum Efficiency Reporting Value: 13 MERV when tested in accordance with ASHRAE 52.2.

C. Differential Pressure Gage:
1. Provide factory installed dial type differential pressure gage, flush mounted with casing outer wall, and fully piped to both sides of each filter to indicate status.
2. Maintain plus/minus 5 percent accuracy within operating limits of 20 degrees F to 120 degrees F.

2.07 DAMPER SECTION

A. Mixing Section: Provide a functional section to support the damper assembly for modulating the volume of outdoor, and return air.

B. Damper Blades:
1. Double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades.
2. Self-lubricating stainless steel or synthetic sleeve bearings.
3. Comply with ASHRAE 90.1 for rated maximum leakage rate.
4. Base all leakage testing and pressure ratings on AMCA 500-D.
5. Arrange in parallel or opposed-blade configuration.

2.08 ACCESS SECTION

A. Provide where indicated on the Drawings to allow for inspection, cleaning, and maintenance of field installed components.

B. Construct access doors same as previously specified within this Section.

2.09 CONTROLS

A. Combination VFD - Disconnects:
1. Provide factory mounted, combination VFD - disconnect in accordance with Section 26 29 23 for each fan motor.
2. Factory mount in full metal enclosure and wire to fan motor.
3. Mount VFD-disconnect on fan section externally in a NEMA 1 enclosure within a dedicated controls section or housed fan section.
a. Internal Enclosure Construction Characteristics:
1) Integral part of unit casing to allow for thermal venting to casing interior.
2) Accessible from unit exterior via access door.
3) Construction of access doors same throughout unit.
4. Include circuit breaker disconnect with through-the-door interlocking handle for externally mounted starters, spring loaded, and designed to rest only in the full and lockable ON or OFF state.
5. Allow enclosure entry via a concealed defeater mechanism when the handle is in the ON position.
6. Include control transformer with sufficient capacity to support the following items:
a. VFD and controls.
b. Binary output on-off wiring.
c. Analog output speed-signal wiring.
d. All interfacing wiring between the VFD and the direct digital controller.
7. Mount starter on fan section externally in a NEMA 1 enclosure within a dedicated controls section or housed fan section.
a. Internal Enclosure Construction Characteristics:
1) Integral part of unit casing to allow for thermal venting to casing interior.
2) Accessible from unit exterior via access door.
3) Construction of access doors same throughout unit.
8. Provide bypass relays and bypass circuitry with VFD-OFF-BYPASS selector switch.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Bolt sections together with gaskets.

C. Isolate fan section with flexible duct connections.

D. Install flexible duct connections between fan inlet and discharge ductwork and air handling unit sections. Ensure that metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

E. Install assembled unit on vibration isolators. Install isolated fans with resilient mountings and flexible electrical leads. Install restraining snubbers as indicated.

F. Make connections to coils with unions or flanges.

G. Hydronic Coils:
   1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
   2. Provide shut-off valve on supply line and lockshield balancing valve with memory stop on return line.
   3. Locate water supply at bottom of supply header and return water connection at top.
   4. Provide manual air vents at high points complete with stop valve.
   5. Ensure water coils are drainable and provide drain connection at low points.

H. Refrigerant Coils: Provide sight glass in liquid line within 12 inches of coil.

I. Insulate coil headers located outside air flow as specified for piping.

J. Field-wire all factory provided controls for field installation.

3.02 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 23 74 13

PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Packaged roof top unit.

B. Unit controls.

C. Roof mounting curb and base.

D. Maintenance service.

1.02 REFERENCE STANDARDS

A. AHRI 270 (SI/I-P) - Sound Performance Rating of Outdoor Unitary Equipment; 2025.

B. Packaged air-cooled condenser units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

C. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

D. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

E. Unit shall be certified in accordance with ANSI Z21.47b/CSA 2.3b and ANSI Z83.8/CSA 2.6, Safety Standard Gas-Fired Furnaces.

F. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

G. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

1.03 SUBMITTALS

A. See Construction Managers requirements for submittal procedures.

B. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics, and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.

C. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances, and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring. Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections

D. Warranty: Submit manufacturer's warranty and ensure forms have been filled out 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.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

B. Unit shall be shipped with doors screwed shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

C. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

D. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

2.02 WARRANTY

A. Provide a two-year warranty to include coverage for parts and labor.

B. Provide a fifteen-year warranty on stainless steel exchanger.

C. Provide a three-year warranty on coil and system and controller.

PART 3 PRODUCTS

3.01 MANUFACTURERS

A. Trane Inc: www.trane.com.

B. Daikin Inc.: www.diakin.com

C. Aaon: www.aaon.com.

3.02 PERFORMANCE REQUIREMENTS

1. See Schedule on drawing for performance requirements.

3.03 AIR CONDITIONING UNITS

A. General: Roof mounted units having gas burner and electric refrigeration.

B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan, heat exchanger and burner, heat recovery coil, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

C. Electrical Characteristics:
   1. See Drawing for schedule and coordinate with electrical drawings.

D. Disconnect Switch: Factory mount disconnect switch in control panel.

3.04 FABRICATION

A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners. Structural members shall be minimum 18 gage, with access doors or panels of minimum 20 gage.

B. Insulation: 1 inch thick neoprene coated glass fiber with edges protected from erosion.

C. Heat Exchangers: Stainless steel, of welded construction.

D. Supply Fan: Backwards curved centrifugal type, resiliently mounted with high efficiency ECM direct drive motor, and rubber isolated hinge mounted. Isolate complete fan assembly.

E. Condenser Fans: ECM motors, direct drive with permanently lubricated ball bearings, thermal overload protection and automatic reset.

F. Air Filters: 2 inch thick MERV-13 glass fiber disposable media.

G. Roof Curb Adaptors: Provide curb adaptor for mounting on existing roof curb with rotating unit 90 degrees. Field verify existing curbs and units for required curb adaptors prior to ordering units.

3.05 BURNER

A. Gas Burner: Induced draft, Natural gas fired system with direct spark ignition, electronic fame sensors, flame rollout switches, High heat Limit switches, pressure regulator, gas valves, manual shut-off, and automatic

B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven and slight delay, allow gas valve to open.

C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.

D. Supply Fan Control: Temperature sensor sensing bonnet temperatures and independent of burner controls, with provisions for continuous fan operation.

3.06 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 capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons cooling capacity and larger.

3.07 COMPRESSOR

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 gage ports, and filter drier.

B. Five minute timed off circuit to delay compressor start.

C. Outdoor thermostat to energize compressor above 35 degrees F ambient.

D. Outdoor thermostat to energize compressor above 57 degrees F ambient.

E. Provide step capacity control by hot gas by-pass.

3.08 CONDENSER COIL

A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil hail guard.

B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

C. Provide refrigerant pressure switches to cycle condenser fans.

3.09 MIXED AIR CASING

A. Dampers: Provide manual outside and return air dampers for fixed outside air quantity.

B. Dampers: Provide remote controlled outside and return air dampers with damper operator and remote rheostat for adjusting outside air quantity.

C. Dampers: Provide outside, return, and relief dampers with damper operator and control package to automatically vary outside air quantity. Outside air damper to fall to closed position. Relief dampers may be gravity balanced.

D. Gaskets: Provide tight fitting dampers with edge gaskets.

E. Gaskets: Provide tight fitting dampers with edge gaskets maximum leakage 5 percent at 2 inches pressure differential.

F. Damper Operator: 24 volt with gear train sealed in oil.

G. Damper Operator, Units 7.5 Ton Cooling Capacity and Larger: 24 volt with gear train sealed in oil with spring return on.

H. Damper Operator: Pneumatic piston or gear driven type with spring return and pilot positioner.

I. Mixed Air Controls: Maintain selected supply air temperature and return dampers to minimum position on call for heating and above 75 degrees F ambient, or when ambient air temperature exceeds return air temperature.

3.10 FACTORY INSTALLED AND FACTORY PROVIDED CONTROLLER

A. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested. Controller shall be capable of standalone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.

B. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.

C. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.

D. Single Zone VAV Controller.

E. Unit shall utilize a variable capacity compressor system and a variable speed fan system to modulate the cooling and airflow as required in meeting the space temperature needs and to save unit operating energy. Unit fan speed shall modulate based on space temperature, not supply air pressure.

F. Unit shall be provided with supply air temperature control. Mixing boxes and bypass ducts shall not be required for operation as a single zone VAV system.

G. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module capable of communicating and integrating with a BACnet network to existing Honeywell control system.

3.11 ROOM THERMOSTATS AND CO2 DETECTORS

A. Coordinate with control contractor for thermostat and CO2 sensors.

PART 4 EXECUTION

4.01 EXAMINATION

A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that proper power supply is available.

C. Field verify all existing roof curbs for new curb adaptor.

4.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount units on curb adapters providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

C. Modify gas piping for new RTU connection location.

4.03 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

4.04 CLOSEOUT ACTIVITIES

A. Demonstrate operation to Owner's maintenance personnel.

4.05 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide service and maintenance of packaged roof top units for one year from Date of Substantial Completion.

C. Provide routine maintenance service with a six month interval as maximum time period between calls.

D. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of four filter replacements, and controls check-out, adjustments, and recalibration.

E. Provide 24-hour emergency service on breakdowns and malfunctions.

F. After each service call, submit copy of service call work order or report that includes description of work performed.

4.06 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 23 74 14

PACKAGED OUTDOOR CENTRAL AIR HANDLING UNITS (RTU-3)

PART 1 GENERAL

1.01 GENERAL DESCRIPTION

A. This section includes the design, controls and installation requirements for packaged rooftop units / heat pumps / outdoor air handling units.

1.02 QUALITY ASSURANCE

A. Packaged air-cooled condenser and air-source heat pump units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

B. Unit shall be certified in accordance with UL Standard 60335-2-40 and CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

C. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

D. Unit shall be certified in accordance with ANSI Z21.47b/CSA 2.3b and ANSI Z83.8/CSA 2.6, Safety Standard Gas-Fired Furnaces.

E. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

F. Unit shall be safety certified by ETL and be ETL US and ETL Canada listed. Unit nameplate shall include the ETL/ETL Canada label.

1.03 SUBMITTALS

A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.

B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Unit shall be shipped with doors bolted shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation. Horizontal configuration units shall include panels covering air intake and discharge openings.

B. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

1.05 WARRANTY

A. Manufacturer shall provide a limited “parts only” warranty for a period of 12 months from the date of equipment startup or 18 months from the date of original equipment shipment from the factory, whichever is less. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer’s written instructions for Installation, Operation, and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts and filters.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Products shall be provided by the following manufacturers:
   1. AAON
   2. Trane Horizon
   3. Daikin Rebel

2.02 ROOFTOP UNITS

A. General Description:
   1. Packaged rooftop unit shall include:
      a. Evaporator coils
      b. Filters
      c. Supply fans
      d. Dampers
      e. Compressors
      f. Air-cooled condenser coils and condenser fans
      g. Reheat coil
      h. Gas heaters
      i. Exhaust fans
      j. Energy recovery wheels
      k. Unit controls
   2. Unit shall be factory assembled and tested including leak testing of the DX coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment's literature pocket.
   3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
   4. Unit components shall be labeled, including refrigeration system components and electrical and controls components.
   5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
   6. Installation, Operation, and Maintenance manual shall be supplied within the unit.
   7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's hinged access door.
   8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's hinged access door.

B. Construction:
   1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
   2. Unit insulation shall have a minimum thermal resistance R-value of 16. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929-11 for a minimum flash ignition temperature of 610°F.
   3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, reduces heat transfer through the panel, and prevents exterior condensation on the panel.
   4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
   5. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
   6. Access to filters, dampers, cooling coils, reheat coil, heaters, energy recovery wheels, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
   7. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
   8. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
   9. Unit shall be provided with bottom discharge and bottom return air openings. Openings shall have upturned flanges of at least 1/2 inch in height around the opening.

10. Unit shall be provided with end discharge and right return air openings. Openings shall have upturned flanges of at least 1/2 inch in height around the opening.
11. Unit shall include lifting lugs on the top of the unit.

C. Electrical:
1. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
2. Unit shall have a 10 kAIC SCCR.
3. Unit shall be provided with a factory installed and field wired 115V, 20 amp GFI outlet in the unit control panel.

D. Supply Fans:
1. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.
2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.
5. Unit shall include barometric relief dampers.

E. Exhaust Fans:
1. Exhaust dampers shall be sized for 100% relief.
2. Fans and motors shall be dynamically balanced.
3. Unit shall include barometric relief dampers.
4. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
5. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.
6. Unit shall include belt driven, unhoused, backward curved, plenum exhaust fans.
7. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

F. Cooling Coils:
1. Evaporator Coils:
   a. Coils shall be designed for use with R-454B refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
   b. Coil shall be standard capacity.
   c. Coils shall have interlaced circuitry and shall be standard capacity.
   d. Coils shall be hydrogen or helium leak tested.
   e. Coils shall be furnished with factory installed expansion valves.

G. Refrigeration System:
1. Unit shall be factory charged with R-454B refrigerant.
2. Compressors shall be scroll type with thermal overload protection and carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory.
3. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam injected panels to prevent the transmission of noise outside the cabinet.
4. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.
5. Each refrigeration circuit shall be equipped with expansion valve type refrigerant flow control.
6. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides and a factory installed liquid line filter driers.
7. Unit shall include 5 stages of capacity control or a variable capacity scroll compressor on the refrigeration circuit which shall be capable of modulation from 10-100% of its capacity.
8. Refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a

dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

9. Reheat coil shall be multi-pass and fabricated from aluminum microchannel tubes.
10. The factory installed controls shall include a 3 minute off delay timer to prevent compressor short cycling. The controls shall also include an adjustable, 20 second delay timer for each additional capacity stage to prevent multiple capacity stages from starting simultaneously and an adjustable compressor lock out.

H. Condensers:
   1. Air-Cooled Condenser
      a. Condenser fans shall be a vertical discharge, axial flow, direct drive fans.
      b. Coils shall be designed for use with R-454B refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.
      c. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.
      d. Coils shall be hydrogen or helium leak tested.
      e. Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.

I. Gas Heating:
   1. Unit shall include a natural gas furnace with 4 stages of capacity control.
   2. Aluminized steel heat exchanger furnace shall carry a 15 year non-prorated warranty, from the date of original equipment shipment from the factory.
   3. Stainless steel heat exchanger furnace shall carry a 25 year non-prorated warranty, from the date of original equipment shipment from the factory.
   4. Gas furnace shall consist of aluminized steel heat exchangers with multiple concavities, an induced draft blower and an electronic pressure switch to lockout the gas valve until the combustion chamber is purged and combustion airflow is established.
   5. Gas furnace shall consist of stainless steel heat exchangers with multiple concavities, an induced draft blower and an electronic pressure switch to lockout the gas valve until the combustion chamber is purged and combustion airflow is established.
   6. Furnace shall include a gas ignition system consisting of an electronic igniter to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.
   7. High Turndown Modulating Natural Gas Furnace shall be equipped with modulating gas valves, adjustable speed combustion blowers, stainless steel tubular heat exchangers, and electronic controller. Combustion blowers and gas valves shall be capable of modulation. Electronic controller includes a factory wired, field installed supply air temperature sensor. Sensor shall be field installed in the supply air ductwork. Supply air temperature setpoint shall be adjustable on the electronic controller within the controls compartment. Gas heater shall be capable of capacity turndown ratio as shown on the unit rating sheet. Heat trace shall be include on the condensate drain line.

J. Filters:
   1. Unit shall include 4 inch thick, pleated panel filters with an ASHRAE MERV rating of 13, upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre filters with an ASHRAE MERV rating of 8, upstream of the 4 inch standard filters.

K. Outside Air/Economizer:
   1. Unit shall include 0-100% economizer consisting of a motor operated outside air damper and return air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 20 cfm of leakage per sq ft. at 4 in. w.g. air pressure differential across the damper. Low leakage dampers shall be Class 2 AMCA certified, in accordance with AMCA Standard 511. Unit shall include outside air opening bird screen and outside air hood. Unit, except for horizontal series, shall also include barometric relief dampers.
      a. Economizer shall be furnished with return air CO2 override.
      b. Economizer shall be furnished with a California Energy Commission Certified Title 24 Fault Detection and Diagnostic package. Economizer assembly shall carry a 5 year parts warranty from the date of original equipment shipment from the factory.

L. Controls:
   1. Factory Installed and Factory Provided Controller
      a. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
      b. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
      c. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
      d. Constant Volume Controller
   2. Unit shall modulate cooling with constant airflow to meet space temperature cooling loads.
   3. With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet space humidity loads and prevent supply air temperature swings and overcooling of the space.
   4. Unit shall modulate heating with constant airflow to meet space temperature heating loads. Staged heating capacity shall modulate based on space temperature.
   5. Unit shall modulate heating with constant airflow to meet space temperature heating loads. Modulating heating capacity shall modulate based on supply air temperature.
      a. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a LonWorks or BACnet network. [Orion Controls System]

M. Accessories:
   1. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

PART 3 EXECUTION

3.01 INSTALLATION, OPERATION, AND MAINTENANCE

A. Installation, Operation, and Maintenance manual shall be supplied with the unit.

B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation, and Maintenance manual instructions.

C. Start up and maintenance requirements shall be complied with to ensure safe and correct operation of the unit.

END OF SECTION

SECTION 23 81 01

TERMINAL HEAT TRANSFER UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cabinet unit heaters.

B. Unit ventilators.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

B. Section 23 21 14 - Hydronic Specialties.

C. Division 26 - Electrical: Electrical characteristics and wiring connections.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide typical catalog of information including arrangements.

C. Shop Drawings:
   1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
   2. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
   3. Indicate mechanical and electrical service locations and requirements.,

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Filters: One set of each type and size.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 WARRANTY

A. Provide five year manufacturers warranty for fan-coil unit.

PART 2 PRODUCTS

2.01 CABINET UNIT HEATERS

A. Manufacturers:
   1. Sterling Hydronics/Mestek Technology, Inc: www.sterlingheat.com.
   2. Trane Inc: www.trane.com.
   3. Vulcan Radiator, A Mestek Company: www.vulcanrad.com.

B. Coils: Evenly spaced aluminum fins mechanically bonded to copper tubes, designed for 100 psi and 220 degrees F.

C. Cabinet: 0.0598 inch steel with exposed corners and edges rounded, easily removed panels, glass fiber insulation and integral air outlet.

D. Finish: Factory applied baked enamel of color as selected on visible surfaces of enclosure or cabinet.

E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.

F. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

G. Control: Multiple speed switch, factory wired, located in cabinet.

H. Filter: Easily removed 1 inch thick glass fiber throw-away type, located to filter air before coil.

I. Mixing Dampers: Where indicated, mixing sections with dampers. Refer to Section 23 09 93 for operating sequence.

J. Capacity: As Scheduled, based on 65 degree F entering air temperature, 180 degree F average water temperature.

K. Electrical Characteristics:
   1. See drawings.

2.02 UNIT VENTILATORS

A. Manufacturers:
   1. Daikin: www.diakin.com
   2. Trane Inc: www.trane.com.
   3. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

B. Coils: Copper tubes mechanically expanded into evenly spaced aluminum fins tested to operate at 150 psi.

C. Cabinet: 0.0747 inch steel on solid base pan with exposed edges rounded. Provide removable front panels with quick-acting, key-operated cam locks. Provide removable die-cast or fabricated steel discharge grilles.

D. Finish: Factory apply baked enamel of color as selected on visible surfaces of enclosure or cabinet.

E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven, arranged to draw air through coil.

F. Wall Louvers: Existing louver and intakes.

G. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

H. Air Cooled Condensing Unit: Corrosion resistant cabinet, with hermetically sealed compressor with internal spring isolation, external isolation, permanent split capacitor motor and overload protection, copper tube aluminum fin condenser coil, direct drive propeller fan with permanently lubricated ball bearing single phase motor with internal overload protection.

I. Control: Multiple speed switch, factory wired, located in cabinet.

J. Filter: Easily removed 1 inch thick glass fiber throw-away type, located to filter air before coil.

K. Mixing Dampers: Multi-blade with compressible seal, capable of varying proportion of mixed air from 100 percent room air to 100 percent outside air.

L. Heating Capacity: As Scheduled, based on 65 degree F entering air temperature, 180 degree F average water temperature.

M. Electrical Characteristics:
   1. See drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.

C. Protection: Provide finished cabinet units with protective covers during balance of construction.

D. Cabinet Unit Heaters: Install as indicated. Coordinate to assure correct recess size for recessed units.

E. Unit Ventilators: Locate as indicated, level and shim units, and anchor to structure. Coordinate exact location of wall louvers.

F. Units with Cooling Coils: Connect drain pan to condensate drain.

3.02 CLEANING

A. After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

B. Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

C. Install new filters.

3.03 SCHEDULES - SEE DRAWINGS

END OF SECTION

SECTION 26 05 05
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. Verify field measurements and circuiting arrangements are as indicated.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Design Professional before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner before partially or completely disabling system.
   2. Notify local fire service.
   3. Make notifications at least 24 hours in advance.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Disconnect and remove abandoned panelboards and distribution equipment.

F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

H. Repair adjacent construction and finishes damaged during demolition and extension work.

I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR

A. See Construction Manager’s General Requirements for additional cleaning requirements.

B. Clean and repair existing materials and equipment that remain or that are to be reused.

C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Metal-clad cable.

C. Wiring connectors.

D. Electrical tape.

E. Heat shrink tubing.

F. Wire pulling lubricant.

G. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

D. Section 28 46 00 - 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; 2011 (Reapproved 2018).

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 D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.

F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.

G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

H. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2018.

I. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2021.

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

K. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

L. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

N. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

O. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

P. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

Q. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. 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.

C. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

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.

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. Armored cable is **NOT** permitted.

G. Metal-clad cable is permitted only as follows:
   1. Where not otherwise restricted, may be used only:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
         1) Maximum Length: 6 feet.
      b. Where concealed in hollow stud walls for branch circuits up to 20 A.
         1) Exception: Provide single conductor building wire in EMT raceway for circuit homerun to room served.

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. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.

I. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are **NOT** acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 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.

J. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

L. 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. 480Y/277 V, 3 Phase, 4 Wire System:
        1) Phase A: Brown.
        2) Phase B: Orange.
        3) Phase C: Yellow.
        4) Neutral/Grounded: Gray.
    b. 208Y/120 V, 3 Phase, 4 Wire System:
        1) Phase A: Black.
        2) Phase B: Red.
        3) Phase C: Blue.
        4) Neutral/Grounded: White.
    c. Equipment Ground, All Systems: Green.
    d. Travelers for 3-Way and 4-Way Switching: Purple.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
1. Copper Building Wire:
    a. Cerro Wire LLC: www.cerrowire.com.
    b. Encore Wire Corporation: www.encorewire.com.
    c. Southwire Company: www.southwire.com.

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, except as indicated below.
    a. Size 4 AWG and Larger: Type XHHW-2 or THHN/THWN-2.
    b. Installed Underground: Type XHHW-2.
    c. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

F. Provide dedicated neutral conductor for each phase conductor.

2.04 METAL-CLAD CABLE

A. Manufacturers:
1. AFC Cable Systems Inc: www.afcweb.com.
2. Encore Wire Corporation: www.encorewire.com.
3. Southwire Company: www.southwire.com.

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. Grounding: Full-size integral equipment grounding conductor.

G. Armor: Steel, interlocked tape.

2.05 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 26 05 26.

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 mechanical connectors or 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. Do **NOT** use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

H. Mechanical Connectors: Provide bolted type or set-screw type.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

2.06 WIRING ACCESSORIES

A. Electrical Tape:
   1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   2. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
   3. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
   4. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

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.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

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 shown on the drawings.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft of location shown.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
      a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
      b. Increase size of conductors as required to account for ampacity derating.
      c. Size raceways, boxes, etc. to accommodate conductors.
   7. 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 **NOT** permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

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

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Install metal-clad cable (Type MC) in accordance with NECA 120.

E. 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.

F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

G. 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.

H. 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.

I. Install conductors with a minimum of 12 inches of slack at each outlet.

J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

K. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

L. 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. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

M. 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.

N. Insulate ends of spare conductors using vinyl insulating electrical tape.

O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

P. 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.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

1.02 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 56 00 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2025.

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

D. 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 Design Professional of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

C. Field quality control test reports.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. 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.

E. 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 interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
      a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.

F. Pole-Mounted Luminaires: Also comply with Section 26 56 00.

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 26 05 26:
   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 exothermic welded connections for underground, concealed and other inaccessible connections.
      a. Exceptions:
         1) Use mechanical connectors for connections to electrodes at ground access wells.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

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. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

C. 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.

D. Identify grounding and bonding system components in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Construction Manager’s General Requirements for additional quality requirements.

B. Perform inspection, testing, and adjusting in accordance with Construction Manager’s General Requirements.

C. Inspect and test in accordance with NETA ATS except Section 4.

D. Perform inspections and tests listed in NETA ATS, Section 7.13.

E. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

F. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

SECTION 26 05 29

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 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

B. Section 26 05 33.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

C. Section 26 05 33.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

D. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

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; 2023.

F. 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 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 Design Professional of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

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 electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose indicated, 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 with a minimum safety factor of 25%. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do **NOT** use products for applications other than as permitted by NFPA 70 and product listing.
5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable 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. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    a. Equipment Supports: 1/2 inch diameter.
    b. Single Conduit up to 1 inch trade size: 1/4 inch diameter.
    c. Single Conduit larger than 1 inch trade size: 3/8 inch diameter.
    d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
    e. Outlet Boxes: 1/4 inch diameter.
    f. Luminaires: 1/4 inch diameter.

F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
3. Mounting Height: Provide minimum clearance of 6 inches under supported component totop of roofing.

G. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA1.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Design Professional, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Design Professional, do not provide support from roof deck.

F. Do **NOT** penetrate or otherwise notch or cut structural members without approval of Design Professional.

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

SECTION 26 05 13.13

CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Aluminum rigid metal conduit (RMC).

C. Intermediate metal conduit (IMC).

D. PVC-coated galvanized steel rigid metal conduit (RMC).

E. Flexible metal conduit (FMC).

F. Liquidtight flexible metal conduit (LFMC).

G. Electrical metallic tubing (EMT).

H. Rigid polyvinyl chloride (PVC) conduit.

I. Conduit fittings.

1.02 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.

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); 2025.

D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

F. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.

G. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.

H. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.

I. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

J. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.

K. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.

L. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.

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

N. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

O. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

P. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless 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 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

U. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
5. Notify Design Professional of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Project Record Documents: Record actual routing for conduits installed underground and conduits 2 inch trade size and larger.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
1. Under Slab on Grade: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
2. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
3. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
4. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.
5. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.

D. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

E. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

F. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

G. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

H. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
1. Locations subject to physical damage include, but are not limited to:
a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

I. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit or MC Cable.
   1. Maximum Length: 6 feet.

J. Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.

2.02 CONDUIT REQUIREMENTS

A. Electrical Service Conduits: Also comply with Section 26 21 00.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

C. Provide products listed, classified, and labeled as suitable for the purpose indicated.

D. 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. Underground, Interior: 3/4 inch (21 mm) trade size.
   4. Underground, Exterior: 1 inch (27 mm) trade size.

E. 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. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are **NOT** permitted.

2.04 ALUMINUM RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use aluminum.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 INTERMEDIATE METAL CONDUIT (IMC)

A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.06 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.

C. PVC-Coated Fittings:
   1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
   2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.

D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.

2.07 FLEXIBLE METAL CONDUIT (FMC)

A. 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 to be used.

B. 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.

2.08 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. 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.

2.09 ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. 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.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do **NOT** use indenter type connectors and couplings.

2.10 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. 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.

B. 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.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.

E. Install intermediate metal conduit (IMC) in accordance with NECA 101.

F. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.

G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

H. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

I. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Within joists in areas with no ceiling.
   5. Unless otherwise approved, do **NOT** route conduits exposed:
      a. Across floors.
      b. Across roofs.
      c. Across top of parapet walls.
      d. Across building exterior surfaces.
   6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
   7. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
   8. Arrange conduit to provide no more than 150 feet between pull points.
   9. Route conduits above water and drain piping where possible.
   10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
   11. Group parallel conduits in the same area together on a common rack.

J. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   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 of wire for support of conduits is **NOT** permitted.

K. 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 or insulated throats at all conduit terminations to protect conductors.
   7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

L. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Design Professional.
   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. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
8. 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. Include proposed locations of penetrations and methods for sealing with submittals.
9. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

M. Underground Installation:
1. Provide trenching and backfilling in accordance with Sections 31 00 00.
2. Minimum Cover, Unless Otherwise Indicated or Required:
   a. Underground, Exterior:
3. Provide underground warning tape in accordance with Section 26 05 53 along entire conduit length for service entrance where not concrete-encased.

N. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

O. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

P. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 24 inches at each end.

Q. Provide grounding and bonding in accordance with Section 26 05 26.

R. Identify conduits in accordance with Section 26 05 53.

3.02 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 26 05 33.16

BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Floor boxes.

1.02 RELATED REQUIREMENTS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems.

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 27 26 - Wiring Devices:
   1. Wall plates.
   2. Floor box service fittings.
   3. Additional requirements for locating boxes for wiring devices.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

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 Design Professional of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground handhole enclosures.

C. Samples:
   1. Floor Boxes: Provide one sample(s) of each floor box proposed for substitution upon request.

D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Construction Manager's General Requirements for additional provisions.
   2. Keys for Lockable Enclosures: Two of each different key.

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 by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
   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, 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.
   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. 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 26 27 26.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
   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:
      a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.

D. Floor Boxes:
1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26; 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. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
4. Manufacturer: Same as manufacturer of floor box service fittings.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 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 to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Design Professional.
2. Locate boxes as required for devices installed under other sections or by others.
    a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
3. Locate boxes so that wall plates do not span different building finishes.
4. Locate boxes so that wall plates do not cross masonry joints.
5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
6. Do **NOT** install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
7. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
8. 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 separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
    b. Do **NOT** install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
9. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Design Professional:
    a. Concealed above accessible suspended ceilings.
    b. Within joists in areas with no ceiling.
    c. Electrical rooms.
    d. Mechanical equipment rooms.

H. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 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.

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 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 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. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

O. Close unused box openings.

P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

Q. Provide grounding and bonding in accordance with Section 26 05 26.

R. Identify boxes in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 05 53

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. Voltage markers.

E. Underground warning tape.

F. Floor marking tape.

G. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 09 90 00 - Painting and Coating.

B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

C. Section 26 27 26 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.

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

D. 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. See Construction Manager’s General Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. 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 main overcurrent protective device.

5) 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) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.

c. Enclosed switches, circuit breakers, and motor controllers:
1) Identify voltage and phase.
2) Identify power source and circuit number. Include location when not within sight of equipment.
3) Identify load(s) served. Include location when not within sight of equipment.

2. Service Equipment:
a. Use identification nameplate to identify each service disconnecting means.
b. Use identification nameplate at each piece of service equipment to identify the available fault current and the date calculations were performed.

3. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
4. Use floor marking tape to identify required equipment working clearances for all electrical distribution equipment.
5. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
a. Service equipment.
b. Industrial control panels.
c. Motor control centers.
d. Industrial machinery.

6. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.

C. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
a. At each source and load connection.
b. Within boxes when more than one circuit is present.

4. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

D. Identification for Raceways:
1. Use identification labels or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.
2. Use identification labels or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
3. Use underground warning tape to identify underground raceways.

E. Identification for Boxes:
   1. Use voltage markers or color coded boxes to identify systems other than normal power system.
      a. Color-Coded Boxes: Field-painted in accordance with Section 09 91 23 and 09 91 13 per the same color code used for raceways.
   2. Use identification labels to identify circuits enclosed.

F. Identification for Devices:
   1. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
   2. Use identification label to identify fire alarm system devices.
   3. Use identification label or engraved wallplate to identify serving branch circuitfor all receptacles and switches.
   4. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
      b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
   2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
   3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
   4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
   5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
   1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
      a. Use only for indoor locations.
   2. 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 by 2.5 inches.
   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.
      b. Equipment Designation: 1/2 inch.
   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 by 1.5 inches.
   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. Color: Black text on clear background.

E. Format for Fire Alarm Device Identification:
   1. Minimum Size: 3/8 inch by 1.5 inches.
   2. Legend: Designation indicated and device zone or address.
   3. Text: All capitalized unless otherwise indicated.
   4. Minimum Text Height: 3/16 inch.
   5. Color: Red text on white background.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch.

F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl orself-adhesive vinyl cloth type markers.

B. Minimum Size:
   1. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
   2. Markers for Junction Boxes: 1/2 by 2 1/4 inches.

C. Legend:
   1. Markers for System Identification:

D. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE

A. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.

C. Legend: Type of service, continuously repeated over full length of tape.

D. Color:

2.06 FLOOR MARKING TAPE

A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlaminate, 3 inches wide, with alternating black and white stripes.

2.07 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
   1. Materials:
   2. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 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. Conduits: Legible from the floor.
8. Boxes: Outside face of cover.
9. Conductors and Cables: Legible from the point of access.
10. 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 below finished grade.

G. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 08 00
ELECTRICAL COMMISSIONING AND TESTING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. This specification includes the commissioning process requirements for Electrical equipment, systems and assemblies.

B. Refer to Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.02 SCOPE OF COMMISSIONING

A. The following Electrical systems are to be commissioned:
   1. Lighting Controls
   2. Transformers

B. Refer to Division 01 Section "General Commissioning Requirements" for general commissioning scope.

1.03 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.04 DOCUMENTATION

A. Refer to Division 01 Section "General Commissioning Requirements" for documentation to be provided by the CxA.

B. Refer to Division 01 Section "General Commissioning Requirements" for documentation to be provided by the construction manager and contractor. In addition, provide the following:
   1. Equipment Start Up Reports. See equipment specific specifications for Start Up requirements.

1.05 COORDINATION

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to coordination during the commissioning process.

1.06 RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to responsibilities during the commissioning process.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from the vendor) required for testing shall be included in the base bid price to the Owner and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.

D. Temporary data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 EXECUTION

3.01 STARTUP PLANS AND REPORTS

A. For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 2 weeks prior to startup.

B. For each item of equipment and system for which the manufacturer provides a startup report, document compliance by submitting the completed startup checklist and final startup report, signed and dated by the responsible entity.

3.02 PREFUNCTIONAL CHECKLISTS

A. A Prefunctional Checklist is required to be filled out for each item of equipment or system to be commissioned.
   1. These checklists do not replace manufacturer's recommended startup checklists regardless of apparent redundancy.
   2. The following types of information will be gathered via the completed Prefunctional Checklist forms:
      a. Certification by installing contractor that the unit is properly installed, started up, operating, and ready for Functional Testing.
      b. Manufacturer, model number, and relevant capacity information. List information "as installed."
      c. Serial number of installed unit.

B. Contractor is responsible for filling out Prefunctional Checklists after completion of installation and before operational startup. Witness of operational startup by the Commissioning Authority is not required unless otherwise specified.
   1. Each line item is to be initialed and dated by the Contractor. Checklists are not complete until all line items are initialed and dated without deficiencies.
   2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing. Re-submission of the Checklist is required upon completion of remaining items.
   3. Individual Checklists may contain line items that are the responsibility of more than one installer. Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
   4. If any Checklist line item is not relevant, record reasons on the form.
   5. Contractor may independently perform startup inspections and/or tests at Contractor's option.
   6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
   7. Submit completed Checklists to Commissioning Authority within two days of completion.

C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
   1. Provide all additional information requested by Commissioning Authority to aid in preparation of Checklists, such as shop drawing submittals, manufacturer's startup checklists, and operation & maintenance data.
   2. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in Contract Documents or not.

D. Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
   1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.03 FUNCTIONAL TESTING FOR LIGHTING CONTROL SYSTEMS

A. Electrical Contractor and Lighting Control agency shall perform Functional Performance testing for all luminaires and control systems.

B. Equipment functional performance testing shall demonstrate the installation and operation of components, systems and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function and maintenance serviceability for each of the commissioned systems are confirmed. Testing shall include all modes and sequence of operation, including under full-load, part-load and the following emergency conditions:
   1. All modes as described in the Lighting Controls Narrative and Lighting Controls Matrix.
   2. Redundant or automatic back-up mode.
   3. Performance of alarms.
   4. Mode of operation upon a loss of power and restoration of power.

C. Occupant Sensor Controls
   1. Where occupant sensor controls are provided, the following procedures shall be performed:

a. Certify that the occupant sensor has been located and aimed in accordance with manufacturer recommendations.
b. For projects with seven of fewer sensors, each sensor shall be tested.
c. For projects with more than seven occupant sensors, testing shall be done for each unique combination of sensor type and space geometry. Where multiples of each unique combination of sensor type and space geometry are provided, not less than 10 percent, but in no case less than one, of each combination shall be tested unless the code official or design professional requires a higher percentage to be tested. Where 30 percent or more of the tested controls fail, all remaining identical combinations shall be tested.
d. For occupant sensor controls to be tested, verify the following:
    1) Where occupant sensor controls include status indicators, verify correct operation.
    2) The controlled lights turn off or down to the permitted level within the required time.
    3) For auto-on occupant sensor controls, the lights turn on to the permitted level when an occupant enters the space.
    4) For manual-on occupant sensor controls, the lights turn on only when manually activated.
    5) The lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.

3.04 FUNCTIONAL TESTS

A. A Functional Test is required for EACH item of equipment, system, or other assembly specified to be commissioned unless SAMPLING of multiple identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests after completion of Prefunctional Checklists and before closeout.

C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation of forms for that purpose.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner. If a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and record the Contractor's stated intentions for correction.
    1. Deficiencies are any condition in the installation or function of a component, piece of equipment, or system that is not in compliance with Contract Documents or does not perform properly.
    2. When the deficiency has been corrected, the Commissioning Authority will reschedule the test and the Contractor shall re-test.
    3. If 10 percent of identical items fail to perform due to materials or manufacturing defect, all items will be considered defective. Contractor shall provide a proposal for correction within 2 weeks after notification of defect.
    4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time to witness re-testing.

E. Functional Test Procedures:
    1. Examples of Functional Testing:
        a. Test the dynamic function of equipment and systems using direct observation and/or monitoring methods under full operation.
        b. Systems are tested under various conditions such as high heating/cooling loads, low heating/cooling loads, component failures, unoccupied mode, fire alarm, power failure, etc.
        c. Systems are subjected to all controls and building automation system sequences of operation. Components are verified to respond accordingly.

F. Deferred Functional Tests: Some tests may need to be performed after substantial completion due to partial occupancy, seasonal requirements, or other site conditions. Performance of these tests remains the Contractor's responsibility regardless of timing.

3.05 TEST PROCEDURES – GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test conditions.

C. Identical Units
   1. Identical units are defined as those with the same application and sequence of operation except for minor size or capacity differences.
   2. Where sample Functional Testing of identical units is permitted, test 30% of the project total. If half of these units fail Functional Testing, all units (i.e. 100% of the project total) shall be inspected and issues remediated by the Contractor. Thereafter, all units (i.e. 100% of the project total) shall undergo Functional Testing.
   3. Sampling is not allowed for:
      a. Major equipment.
      b. Life-safety-critical equipment.

D. For Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance.

E. For Simulated Conditions: Artificially create the necessary condition for the purpose of testing the response of a system.

F. For Over-Writing Values: Change the sensor value known to the control system to see the response of the system.

G. For Indirect Indicators: Observe a response or condition indirectly from a control system screen or other device.

H. For Monitoring: Record parameters of equipment operation using trending capabilities of the control system. Where monitoring of specific points is called for in Functional Testing, complete the following:
   1. Provide hard copies of monitored data in columnar format.
   2. Alternately, provide graphical output if producible by the system.

3.06 OPERATION AND MAINTENANCE MANUALS

A. Contractor to provide final operation & maintenance manuals of commissioned equipment to the Commissioning Authority for review. Contractor to make changes recommended by the Commissioning Authority.

3.07 DEMONSTRATION AND TRAINING

A. Contractor to submit training plan for Owner personnel to the Commissioning Authority for review and approval.

B. Contractor to coordinate scheduling of specified training sessions with invitations to the Commissioning Authority.

C. Contractor to provide sign-in sheet and agenda for each training session along with copies of training aids and documentation to the Commissioning Authority for review.

END OF SECTION

SECTION 26 22 00

LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General purpose transformers.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section 26 05 33.13 - Conduit for Electrical Systems: Flexible conduit connections.

1.03 REFERENCE STANDARDS

A. IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers; 2025.

B. IEEE C57.96 - IEEE Standard Guide for Loading Dry-Type Distribution and Power Transformers; 2013.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

D. NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers; 2015.

E. NEMA ST 20 - Dry Type Transformers for General Applications; 2021.

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

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Include voltage, kVA, impedance, tap configurations, insulation system class and rated temperature rise, efficiency, sound level, enclosure ratings, outline and support point dimensions, weight, required clearances, service condition requirements, and installed features.

C. Shop Drawings: Provide dimensioned plan and elevation views of transformers and adjacent equipment with all required clearances indicated.

D. Project Record Documents: Record actual locations of transformers.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens Industry, Inc: www.usa.siemens.com.

2.02 TRANSFORMERS - GENERAL REQUIREMENTS

A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.

B. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:
   1. Altitude: Less than 3,300 feet.
   2. Ambient Temperature:
      a. Greater than 10 kVA: Not exceeding 104 degrees F.
      b. Less than 10 kVA: Not exceeding 77 degrees F.

C. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.

D. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.

E. Basic Impulse Level: 10 kV.

F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

G. Isolate core and coil from enclosure using vibration-absorbing mounts.

H. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that suitable support frames and anchors are installed where required and that mounting surfaces are ready to receive transformers.

C. Perform pre-installation tests and inspections on transformers per manufacturer's instructions and as specified in NECA 409. Correct deficiencies prior to installation.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1.

B. Install transformers in accordance with manufacturer's instructions.

C. Install transformers in accordance with NECA 409 and IEEE C57.94.

D. Use flexible conduit, under the provisions of Section 26 05 33.13, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

E. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.

F. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.

G. Mount floor-mounted transformers on properly sized 3 inch high concrete pad constructed in accordance with Section 03 30 00.

H. Provide grounding and bonding in accordance with Section 26 05 26.

I. Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.

J. Where not factory-installed, install lugs sized as required for termination of conductors as shown on the drawings.

3.03 ADJUSTING

A. Measure primary and secondary voltages and make appropriate tap adjustments.

B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.04 CLEANING

A. Clean dirt and debris from transformer components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 24 16
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 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; 2023.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.

D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

E. NEMA PB 1 - Panelboards; 2011.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.

G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.

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.

M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

N. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

O. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.

1.03 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 Design Professional of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

D. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Construction Manager's General Requirements, for additional provisions.
   2. Panelboard Keys: Two of each different key.

1.05 FIELD CONDITIONS

A. Maintain ambient temperature within the following limits during and after installation of panelboards:
   1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens Industry, Inc: www.usa.siemens.com.

D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

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. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available faultcurrent at the installed location as indicated on the drawings.
   2. Listed series ratings are **NOT** acceptable.

D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
   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.
      b. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

K. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
   1. Where electronic circuit breakers equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
   2. Where accessory ground fault sensing and relaying equipment is used, equip companion overcurrent protective devices with ground-fault shunt trips.
      a. Use zero sequence ground fault detection method unless otherwise indicated.
      b. Provide test panel and field-adjustable ground fault pick-up and delay settings.

L. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.

M. Load centers are not acceptable.

N. Provide the following features and accessories where indicated or where required to complete installation:
   1. Feed-through lugs.
   2. Sub-feed lugs.

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: Copper, suitable for terminating copper conductors only.
   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 door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate 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.

2.04 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: Aluminum.
   3. Ground Bus Material: Aluminum.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
   1. Provide surface-mounted enclosures as indicated.

2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate 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:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
a. Provide mechanical lugs unless otherwise indicated.
b. 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.
a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
a. Provide the following field-adjustable trip response settings:
1) Long time pickup, adjustable by setting dial.
2) Long time delay.
3) Short time pickup and delay.
4) Instantaneous pickup.
5) Ground fault pickup and delay where ground fault protection is indicated.
6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
7. Provide the following circuit breaker types where indicated:
a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
b. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
8. Do **NOT** use tandem circuit breakers.
9. Do **NOT** use handle ties in lieu of multi-pole circuit breakers.
10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
11. Provide the following features and accessories where indicated or where required to complete installation:
a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.

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. Install products in accordance with manufacturer's instructions.

B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), NEMA PB 1.1, NECA 1 (general workmanship), NECA 407 (panelboards), NEMA PB 1.1, NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

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 26 05 29.

E. Install panelboards plumb.

F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

G. Mount floor-mounted power distribution panelboards on properly sized 3 inch high concrete pad constructed in accordance with Section 03 30 00.

H. Provide grounding and bonding in accordance with Section 26 05 26.

I. Install all field-installed branch devices, components, and accessories.

J. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

K. Set field-adjustable circuit breaker tripping function settings as indicated.

L. Set field-adjustable ground fault protection pickup and time delay settings as indicated.

M. Provide filler plates to cover unused spaces in panelboards.

N. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:
   1. Fire detection and alarm circuits.
   2. Communications equipment circuits.
   3. Intrusion detection and access control system circuits.

O. Identify panelboards in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL

A. See Construction Manager’s General Requirements for additional requirements.

B. Perform inspection, testing, and adjusting in accordance with Construction Manager’s General requirements.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.

E. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.

F. Test GFCI circuit breakers to verify proper operation.

G. Test shunt trips to verify proper operation.

H. 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.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates.

D. Floor box service fittings.

1.02 RELATED REQUIREMENTS

A. Section 26 05 33.16 - Boxes for Electrical Systems.

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.

1.03 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).

E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.

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

G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

I. UL 943 - Ground-Fault Circuit-Interrupters; 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 placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Notify Design Professional of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

D. Provide tamper resistant receptacles for all receptacles installed in classrooms.

E. Provide GFCI protection for receptacles installed within 6 feet of sinks.

F. Provide GFCI protection for receptacles installed in kitchens.

G. Provide GFCI protection for receptacles serving electric drinking fountains.

H. Unless noted otherwise, do not use combination switch/receptacle devices.

I. For flush floor service fittings, use tile rings for installations in tile floors.

J. For flush floor service fittings, use carpet flanges for installations in carpeted floors.

2.02 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Finishes:
   1. All Wiring Devices: White with white nylon wall plate unless otherwise indicated.
   2. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover unless otherwise indicated.
   3. Flush Floor Box Service Fittings: Gray wiring devices with aluminum cover and ring/flange.

2.03 WALL SWITCHES

A. Manufacturers:
   1. Leviton Manufacturing Company, Inc: www.leviton.com.
   2. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/.

B. 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.

2.04 RECEPTACLES

A. Manufacturers:
   1. Leviton Manufacturing Company, Inc: www.leviton.com.
   2. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us.

B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498and 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: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
   2. 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, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE 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.

2.05 WALL PLATES

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com.
2. Leviton Manufacturing Company, Inc: www.leviton.com.
3. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us.

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. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

2.06 FLOOR BOX SERVICE FITTINGS

A. Manufacturers:
1. Thomas & Betts Corporation: www.tnb.com.
2. Wiremold, a brand of Legrand North America, Inc: www.legrand.us.

B. Description: Service fittings compatible with floor boxes provided under Section 26 05 33.16 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: Two standard convenience duplex receptacle(s) with duplex flap opening(s).
2) Voice and Data Jacks:
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.

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 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 26 05 33.16 as required for installation of wiring devices provided under this section.
1. Mounting Heights: Unless otherwise indicated, as follows:
a. Wall Switches: 48 inches above finished floor.
b. Receptacles: 18 inches above finished floor or 6 inches 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 from edge of door frame. Where locations are indicated otherwise, notify Design Professional 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 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. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

J. Install wall switches with OFF position down.

K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

L. 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.

M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

N. Identify wiring devices in accordance with Section 26 05 53.

3.03 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

END OF SECTION

SECTION 26 28 13
FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

1.02 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.

B. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

C. UL 248-10 - Low-Voltage Fuses - Part 10: Class L Fuses; Current Edition, Including All Revisions.

D. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Construction Manager’s General Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.

B. Mersen (formerly Ferraz Shawmut): ferrazshawmut.mersen.com.

C. Littelfuse, Inc: www.littelfuse.com.

2.02 APPLICATIONS

A. Feeders:
   1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.
   2. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.

B. General Purpose Branch Circuits: Class RK1, time-delay.

2.03 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

G. Class R Fuses: Comply with UL 248-12.

H. Class L Fuses: Comply with UL 248-10.

PART 3 EXECUTION

3.01 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 28 16.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 28 13 - Fuses.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

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

E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

G. UL 98 - Enclosed and Dead-Front Switches; 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 Design Professional of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

C. Project Record Documents: Record actual locations of enclosed switches.

1.06 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens Industry, Inc: www.usa.siemens.com.

D. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

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. Ambient Temperature: Between -22 degrees F and 104 degrees F.

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.

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 EN 10250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA EN 10250: 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 BS 31047.
   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.

N. Provide the following features and accessories where indicated or where required to complete installation:
   1. Auxiliary Switch: SPDT switch suitable for connection to system indicated, with auxiliary contact operation before switch blades open and after switch blades close.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install enclosed switches in accordance with manufacturer's instructions.

B. Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.

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 26 05 29.

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 above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 05 26.

H. Provide fuses complying with Section 26 28 13 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

END OF SECTION

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Luminaire accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 05 33.16 - Boxes 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. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2025.

F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

G. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2023.

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

I. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

K. UL 1598 - Luminaires; Current Edition, Including All Revisions.

L. 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 Design Professional of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

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.
   b. Include IES LM-79 test report upon request.
2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Construction Manager's Requirements, for additional provisions.

D. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.06 WARRANTY

A. See Construction Manager's General Requirements, for additional warranty requirements.

B. Provide three year manufacturer warranty for all LED luminaires, including drivers.

C. Provide five year pro-rata warranty for batteries for emergency lighting units.

D. Provide ten 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. 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, 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 Luminaire Components: UL 8750 recognized or listed as applicable.

2.03 EMERGENCY LIGHTING UNITS

A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

C. Battery:
1. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

F. Accessories:
   1. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

2.04 EXIT SIGNS

A. Description: Exit signs and similar signs for special purpose applications such as area of refuge/rescue assistance.

B. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.

C. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
   3. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.05 BALLASTS AND DRIVERS

A. Manufacturers:
      a. Optanium - IOP-2PSP32-SC@120V

B. 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.

2.06 ACCESSORIES

A. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

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 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 1 (general workmanship), and NECA 1 (general workmanship).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Recessed Luminaires:
   1. Install trims tight to mounting surface with no visible light leakage.

F. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Emergency Lighting Units:
   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.

J. 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.

3.03 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Design Professional. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Design Professional or authority having jurisdiction.

C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Design Professional or authority having jurisdiction.

3.04 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

1.02 RELATED REQUIREMENTS

A. Section 26 05 33.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

A. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

C. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).

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

E. UL 1598 - Luminaires; Current Edition, Including All Revisions.

F. 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 Design Professional of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

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. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.
   2. Lamps: Include rated life and initial and mean lumen output.
   3. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

C. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

D. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

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, 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. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

H. LED Luminaire Components: UL 8750 recognized or listed as applicable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

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 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install accessories furnished with each luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

G. Install lamps in each luminaire.

END OF SECTION

SECTION 28 46 00

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Circuits from protected premises to supervising station, including conduit.

B. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

1.02 REFERENCE STANDARDS

A. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. 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 the contract documents.
   4. Proposed maintenance contract.

C. Project Record Documents: See Section Construction Manager's General Requirements 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.

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.

1.05 WARRANTY

A. See Construction Manager's General Requirements, for additional warranty requirements.

B. 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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units - Basis of Design: Existing Systems.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide modifications and extensions to the existing 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. The requirements of the local authority having jurisdiction.
   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. Fire Command Center: Location indicated on drawings.
   7. Master Control Unit (Panel): New, located at fire command center.

2.03 EXISTING COMPONENTS

A. Existing Fire Alarm System: Remove existing components indicated and incorporate remaining components into new system, under warranty as if they were new; do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.

2.04 FIRE SAFETY SYSTEMS INTERFACES

A. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
   1. Kitchen hood suppression activation; also disconnect fuel source from cooking equipment.
   2. Duct smoke detectors.

B. HVAC:
   1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

C. 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.

2.05 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. Initiating Devices:
   1. Smoke Detectors:
      a. Provide 1 extra.
   2. Duct Smoke Detectors:
      a. Provide 1 extra.

C. Notification Appliances:
   1. Speakers:
      a. Provide 1 extra.
   2. Strobes:
      a. Provide 1 extra.

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. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

D. Provide all tools, software, and supplies required to accomplish inspection and testing.

E. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

3.03 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.

3.04 MAINTENANCE

A. See Construction Manager’s General Requirements, for additional requirements relating to maintenance service.

B. 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.

C. Provide to Owner, at no extra cost, a written maintenance contract for entire manufacturer's warranty period, to include the work described below.

D. Comply with Owner's requirements for access to facility and security.

END OF SECTION

SECTION 31 23 01

EXCAVATING, FILLING AND GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work of excavating, filling, and grading includes, but is not necessarily limited to:
   1. Excavating for footings and foundations;
   2. Filling and backfilling to attain indicated grades;
   3. Trenching and trench backfilling;
   4. Rough and finish grading of the site;
   5. Furnishing and installing granular cushion under concrete slabs on grade.

1.02 RELATED REQUIREMENTS

A. Section 02 41 00 - Demolition.

B. Section 02 41 13.13 - Pavement Removal.

C. Section 31 25 00 - Soil Erosion and Sedimentation Control.

D. Section 32 11 24 - Aggregate Base.

1.03 REFERENCES

A. Density Control Handbook, Michigan Department of Transportation.

B. 2020 Michigan Department of Transportation Standard Specifications for Construction.

1.04 QUALITY ASSURANCE/QUALITY CONTROL

A. Soil Density Testing:
   1. Maximum Density of Granular Soils (loss by washing < 15%) and Aggregate
      a. The maximum density will be determined by the One Point Michigan Cone Test, as described in the Michigan Department of Transportation Density Control Handbook.
   2. Maximum Density of Cohesive Soils (loss by washing > 15%)
      a. The maximum density will be determined by the One Point T-99 Test, as described in the Michigan Department of Transportation Density Control Handbook.
   3. Density of In-Place Soils or Aggregate
      a. The in-place density of soils or aggregate will be determined by the Density In-Place (Nuclear) Test, as described in the Michigan Department of Transportation Density Control Handbook.
      b. Job Conditions

B. Dust Control:
   1. The Contractor shall use all means necessary to control dust on and near the work and on and near all off-site borrow areas if such dust is caused by the Contractor's operations during performance of the work or if it results from the condition in which the Contractor leaves the site.
   2. All surfaces shall be thoroughly moistened as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

C. Protection:
   1. The Contractor shall use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain.
   2. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Design Professional and at no additional cost to the Owner.

D. Safety:
   1. The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with Michigan P.A. 154.

E. Permits:
   1. Unless otherwise provided, the Contractor is responsible to obtain and comply with permits required under Parts 31 and 91 of Michigan PA 451 of 1994 (Natural Resources and Environmental Protection Act) and any local ordinances.

PART 2 PRODUCTS

2.01 FILL MATERIAL - GENERAL

A. All fill material shall be subject to the approval of the Design Professional.

B. For approval of fill material, notify the Design Professional at least four working days in advance of intention to import material, designate the proposed borrow area, and permit the Design Professional to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.02 FILL, TRENCH and STRUCTURAL BACKFILL MATERIAL

A. Fill material, unless specified otherwise, shall be soil or soil-rock mixture which is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over six inches in greatest dimension and not more than fifteen percent of the rocks or lumps shall be larger than 2 1/2 inches in greatest dimension.

B. Fill material obtained from offsite sources shall meet the requirements of the preceding paragraph and additionally shall be predominantly granular with a maximum particle size of two inches and a plasticity index of twelve or less.

C. Fill material placed within two feet horizontally of the base of building foundations and/or slabs shall have a plasticity index of 15 or less.

2.03 SAND

A. Sand shall meet the requirements of Granular Material Class II, as specified in the 2020 Michigan Department of Transportation Standard Specifications for construction.

2.04 GRANULAR CUSHION

A. Granular cushion under slabs shall be Granular Material Class II, as specified in the 2020 Michigan Department of Transportation Standard Specifications for construction.

2.05 SAND FOR BACKFILL

A. Sand shall meet the requirements of Granular Material Class II, as specified in the 2020 Michigan Department of Transportation Standard Specifications for Construction.

2.06 STONE FOR PIPE BEDDING

A. Stone shall meet the requirements of Series 6A aggregate, as specified in the 2020 Michigan Department of Transportation Standard Specifications for Construction.

2.07 OTHER MATERIALS

A. All other materials not specifically described but required for a complete and proper installation, shall be as selected by the Contractor subject to the approval of the Design Professional.

PART 3 EXECUTION

3.01 GENERAL

A. Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this Section. The Contractor shall not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to all required inspections, tests, and approvals. Should any of the work be so enclosed or covered up before it has been approved, the Contractor shall uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected, and approved, the Contractor shall make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

B. The Contractor shall excavate ahead of the proposed utility installation to expose any existing buried utilities. If existing utility grades conflict with the proposed utility grade, the proposed utility grade may be adjusted by the Design Professional if necessary, to miss the existing utility grade at no additional expense to the contract.

3.02 EXCAVATING

A. Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, the Contractor shall open the depression and remove all debris and soft material as directed by the Design Professional.

B. The Contractor shall excavate to the grades shown on the drawings. Where excavation grades are not shown on the drawings, excavation shall be completed as required to accommodate the installation.

C. All over-excavated areas shall be backfilled and compacted, and at no additional cost to the Owner.

3.03 PREPARATION OF SUBGRADE

A. After the site has been cleared, stripped, and excavated to within six inches of the specified depths for recompaction; the exposed surface shall be scarified to a minimum depth of six inches, thoroughly moisture-conditioned, and compacted to the requirements specified for fill below.

B. All ruts, hummocks, and other uneven surfaces shall be removed by surface grading prior to placement of fill.

3.04 EXCESS WATER CONTROL

A. Fill material shall not be placed, spread or rolled during unfavorable weather conditions. Operations shall not resume until moisture content and fill density are satisfactory to the Design Professional. Berms or channels shall be provided to prevent flooding of subgrade. All water collecting in depressions shall be promptly removed.

B. Where soil has been softened or eroded by flooding or placement during unfavorable weather, all damaged areas shall be removed and compacted as specified for fill and compaction below.

C. The Contractor shall provide suitable means and equipment to maintain excavations and other parts of the work free from water.

D. Dewatering means shall provide dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.05 FILL AND COMPACTION

A. After subgrade compaction has been approved by the Design Professional, the Contractor shall place approved fill material in layers not exceeding ten inches in uncompacted thickness.

B. The fill material shall be watered or aerated as necessary, and thoroughly mix to obtain a moisture content which will permit proper compaction.

C. Each soil layer shall be compacted to at least the specified minimum degree. The filling and compaction process shall be repeated until plan grade is attained.

D. Compaction Requirements

1. Unless otherwise specified on the drawings or in other sections of the specifications, fill and backfill shall be placed in eight inch lifts and each lift shall be compacted to not less than the following percentages of the maximum density.

BACKFILL/FILL TYPE	PCT. OF MAXIMUM DENSITY REQUIRED
Granular backfill/fill within the influence of pavements, structures or utilities	95%
Granular backfill/fill not within the influence of pavements, structures or utilities	90%
Cohesive backfill/fill not within the influence of pavements, structures or utilities	90%

2. For the purpose of the preceding table; within the influence of pavements, structures, or utilities is considered as being within the one on one influence of the bearing plane of the item.
3. Compaction by jetting will not be permitted unless specifically authorized by the Design Professional.

3.06 GRADING

A. Except as otherwise directed by the Design Professional, the Contractor shall perform all rough and finish grading required to attain the elevations shown on the drawings.

B. Tolerances for grading shall be as follows:

1. Rough grade:
   a. Building areas: Plus or minus 0.1 foot
   b. Landscaped areas: Plus or minus 0.25 feet
2. Finish grade:
   a. Granular cushion under concrete slabs: Plus or minus 0.05 foot
   b. Landscaped areas: Plus or minus 0.10 foot

C. After grading is completed and has been accepted by the Design Professional, the Contractor shall permit no further excavating, filling, or grading.

D. The Contractor shall use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.07 EXCAVATION FOR FOOTINGS

A. Earth surfaces upon which footings will be placed shall be compacted in accordance with the compaction requirements established in this section of these specifications.

B. The Contractor shall verify that all compaction is complete and approved prior to excavating for footings.

C. The Contractor shall excavate to the required lines and grades. The bottom of trenches shall be cut level and all loose soil shall be removed. Where soft spots are encountered, unsuitable materials shall be removed and replaced with flowable fill at no additional cost to the Owner.

3.08 PLACING GRANULAR CUSHION

A. The Contractor shall carefully place the specified granular cushion in areas to receive concrete slabs on grade, uniformly attaining the thickness indicated on the drawings, and providing all required transition planes.

3.09 TRENCHING

A. The Contractor shall perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these specifications.

B. All trenches shall be open construction with sufficient width to provide free working space at both sides of the trench and around the installed item as required for pipelaying, backfilling, and compacting.

C. Trenching shall be completed as required to provide the elevations shown on the drawings. Where elevations are not shown on the drawings, trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe, measured from the adjacent finished grade.

D. Where trench excavation is inadvertently carried below proper elevations, the over-excavated area shall be backfilled with material approved by the Design Professional, and then compacted to provide a firm and unyielding subgrade and/or foundation to the approval of the Design Professional and at no additional cost to the Owner.

E. The Contractor shall properly support all trenches in accordance with all applicable rules and regulations.

F. The Contractor shall brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.

G. In the event of damage to such improvements, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Design Professional and at no additional cost to the Owner.

H. Bracing, sheeting, and shoring shall be constructed so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength. The Contractor shall exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse and caving of the excavation faces being supported.

I. Trenched material shall be stockpiled in a manner to prevent water running into the excavations. Surface drainage shall not be obstructed. A means shall be provided whereby storm and wastewaters are diverted into existing gutters, other surface drains, or temporary drains.

3.10 FOUNDATION FOR PIPES

A. Trench bottoms shall be graded to provide a smooth, firm, and stable foundation free from rock points throughout the length of the pipe.

B. A minimum of four inches of sand or stone bedding shall be placed in the bottom of the trench.

C. In areas where soft, unstable materials are encountered at the surface where the bedding is to be placed, the unstable material shall be removed and replaced with material approved by the Design Professional. The area shall be undercut to a sufficient depth to develop a firm foundation for the item being installed. Over excavation and replacement of material shall be the responsibility of the Contractor and shall be at no additional cost to the Owner.

D. At each joint in pipe, the bottom of the trench shall be recessed as required to relieve the bell of the pipe of all load and to ensure continuous bearing of the pipe barrel on the firm foundation.

E. The pipe subgrade shall be shaped to fit the bottom of the trench to the pipe shape.

3.11 BEDDING FOR PIPES

A. The specified bedding shall be placed in the trench, simultaneously on each side of the pipe for the full width of the trench, to a depth of at least 12 inches over the outside diameter of the pipe barrel.

B. The bedding material shall be compacted after placing along both sides of the pipe.

C. Firm bedding support on the underside of the pipe and fittings shall be provided for the full length of the pipe.

3.12 BACKFILL FOR PIPES

A. After the pipe has been thoroughly bedded and covered, suitable excavated material shall be placed in uniform lifts of not more than ten inches in uncompacted thickness, and then compacted as specified in this section. The spreading and compacting procedure shall be repeated until the adjacent grade level is attained. Backfill material shall be sand when in the influence of structures, pavement, or utilities.

END OF SECTION

SECTION 31 25 00

SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The Contractor shall provide permanent and/or temporary erosion and sedimentation control as called for on the plans and as required by the county soil erosion agent and permit.

1.02 DEFINITIONS

A. Major rainfall event – 1/4-inch or more precipitation over a period, delineated by dry periods of at least 24 hours.

1.03 REFERENCES

A. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

B. ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

C. ASTM D4491 – Standard Test Method for Water Permeability of Geotextiles by Permittivity

D. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles

E. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

F. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile

G. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

H. Michigan Department of Transportation 2020 Standard Specifications for Construction

1.04 RELATED WORK

A. Section 32 92 18 - Lawn Restoration.

1.05 QUALITY ASSURANCE

A. Perform and maintain Work in accordance with the Soil Erosion and Sedimentation Control Act 347 of 1972, any amendments to, and corresponding rules of the Michigan Water Resources Commission.

1.06 REGULATORY REQUIREMENTS

A. The Contractor shall apply for and obtain an Act 451 permit from the local Soil Erosion and Sedimentation Control Enforcing Agent. The Contractor shall pay all permit fees and provide any required bonds or insurance.

1.07 SCHEDULING

A. Control measures shall be constructed by the Contractor prior to the time construction starts uphill or upstream from the control measure location.

B. The Contractor shall inspect all temporary erosion control measures weekly and within 18 hours of major rainfall events.

C. Maintenance and replacement of erosion control measures shall be completed by the Contractor when necessary, or as directed by the soil erosion control agent or the Design Professional.

D. Removal and cleanup of temporary control structures shall be provided by the Contractor within one week after the control measure is no longer needed.

1.08 GENERAL SOIL EROSION-SEDIMENTATION CONTROL

A. Keep disturbed areas small.

B. Stabilize and protect disturbed areas as soon as possible.

C. Keep storm water runoff velocities low.

D. Protect disturbed areas from runoff.

E. Retain sediment within the construction area.

PART 2 PRODUCTS

2.01 MATERIALS

A. Geotextiles
   1. Geotextiles for filters shall be non-woven, meeting the requirements of the table below.
   2. Silt fence geotextiles shall meet the requirements of the following table and shall be designed to collect eroded sediment transported in storm water runoff. The fabric shall have at least 70 percent minimum retained strength after 500 hours of U.V. exposure when tested according to ASTM D4355.

Geotextile Category	PROPERTY TEST METHOD					
	Grab Tensile Strength (min) ASTM D4632 lbs	**Trapezoid Tear Strength (min) ASTM D4533 lbs**	**Puncture Strength (min) ASTM D4833 lbs**	**Mullen Burst Strength (min) ASTM D3786 psi (a)**	**Permittivity ASTM D4491 Per second**	**Apparent Opening Size (max) ASTM D4751 (b) Millimeters**
Filters	90	45	45	140	0.5	0.21
Silt Fence	100 (c)	45	--	--	0.1	0.60

a. ASTM D3786. The fluid displacement rate for the Mullen burst test equipment must be 170+ or - 5 ml/minute. Subtract tare strength from the ultimate burst strength as specified by ASTM.
b. Filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) is permitted as an alternate test method to ASTM D4751 for non-woven geotextiles.
c. Elongation at the specified grab tensile strength not to exceed 40 percent for silt fence.

2.02 MIXTURES

A. Seed
   1. Seed shall meet the requirements of Section 32 92 18 - Lawn Restoration.

2.03 FABRICATED ITEMS

A. Silt Fence:
   1. Geotextile for silt fences shall meet the requirements of Section 2.01. The geotextile shall be attached to machine pointed No. 2 common grade hardwood posts, using at least 5 staples through wood lath a minimum of 3/8-inch thick and 2 feet long. Post spacing shall not exceed 61/2 feet. Posts must be of sufficient length and cross-section to support the installed silt fence under full sediment load; however, posts shall have cross-sectional area of at least 21/4 square inches and shall be a minimum of 36 inches in length. Silt fence fabric must be a minimum height of 21/2 feet. Silt fence shall have at least two permanent markings or affixed labels per assembled roll which positively identifies the fabricator.

B. Filter Sacks:
   1. All materials shall adhere to the requirements of the Michigan Department of Transportation 2020 Standard Specifications for Construction, except fabric drop, which shall consist of a geotextile filter sack inserted into the drainage structure under the cover.
   2. Filter sack shall be as manufactured by “Siltsack”, “Catch-All”, “Ultra-Urban Filter”, “Flogard + Plus”, or approved equal. The filter sacks shall be installed and maintained in accordance with the manufacturer’s specifications.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Contractor shall perform work on the project in a manner which prevents or reduces erosion and controls sedimentation. The Contractor shall provide controls which keep sedimentation from the project area, within the limits of the project area, and out of any lake, river, stream, wetland, or storm drain.

B. The Contractor shall install appropriate controls or measures to control or prevent erosion or sedimentation from the project area before beginning any earth disturbance operations. Temporary erosion and

sedimentation control measures shall be maintained by the Contractor, until such times as disturbed areas have become permanently stabilized.

C. During the life of the project, the Contractor shall provide any additional soil erosion or sedimentation control measures necessary to address specific problems which develop in and adjacent to the project area.

3.02 TIME LIMITATIONS

A. Grading operations shall be completed as soon as practical. Permanent soil erosion controls for disturbed areas shall be completed within 5 calendar days of the completion of grading, except that permanent measures shall be completed within 24 hours when the disturbed area is within 150 feet of a lake, stream, river, or wetland area.

B. Temporary soil erosion measures shall be implemented when it is not practical to complete the permanent measures.

3.03 AREA LIMITATIONS

A. For linear projects (roads, sewers, water main, etc.), the length of the disturbed area shall be limited to 1/2-mile, unless otherwise approved by the Engineer.

B. Areas outside the project right-of-way or outside the grading limits shown on the drawings shall not be disturbed, unless otherwise approved by the Engineer.

3.04 CONSTRUCTION OF EROSION AND SEDIMENTATION CONTROLS

A. The Contractor shall provide all permanent and temporary erosion and sedimentation controls shown on the drawings, required by the permitting agency, or necessary to appropriately control erosion and sedimentation from the project area.

B. Silt Fence:
   1. The Contractor shall furnish, erect, and maintain silt fence around the perimeter of the project area where earth will be disturbed and sediment from the disturbed area could be conveyed.

C. Filters:
   1. Fabric or stone filters shall be installed in waterways or in advance of inlets to drainage courses or storm sewers.

D. Seeding:
   1. Earth areas shall be stabilized with turf immediately following the completion of earthwork and grading activities. Where permanent seeding cannot be completed, earth areas shall be stabilized with temporary seeding. Areas which are properly seeded temporarily for stabilization shall be permanently seeded, as shown, as the work can be appropriately completed.

3.05 MAINTENANCE AND EROSION AND SEDIMENTATION CONTROL

A. The Contractor shall maintain all temporary erosion and sedimentation controls until such time as the permanent measures have been completed and established.

B. The Contractor shall inspect all erosion and sedimentation controls weekly and within 18 hours of a major rain event.

C. Damaged controls or measures shall be replaced or repaired. Sediment shall be cleaned from traps, sumps, basins, filters, and fences periodically. Sediment shall be removed to prevent the accumulation of sediment from exceeding half of the volume of traps, sumps, and basins. Sediment or debris along silt fences shall be removed before the accumulation reaches half the height of the fence.

D. Sediment and debris removed from soil erosion and sedimentation control devices shall be disposed of properly by the Contractor. Sediment shall not be used for fill or backfill in the project area, except when an area is specifically designated on the plans or by the Design Professional.

E. Drainage filters shall be cleaned when an accumulation of silt might reduce flow and result in flooding. Any sediment from the construction area which enters storm sewers or drainage ditches shall be removed by the Contractor. Since sediment can be carried great distances within storm sewers, it may be necessary for many segments of downstream storm sewer segments to be televised, jetted, and vacuumed. If the Engineer believes that the Contractor has allowed or provided the potential for sediment to enter storm sewers or drainage courses, the Contractor will be responsible for the costs of inspection and removing

sediment from downstream drains, whether it can be conclusively proven that the sediment was the result of the Contractor's actions (or inaction).

3.06 REMOVAL OF EROSION AND SEDIMENTATION CONTROL DEVICES

A. Temporary soil erosion and sedimentation control devices shall be removed or obliterated by the Contractor when the permanent measures are in place and established. Any areas damaged by the removal of the temporary devices shall be corrected by the Contractor.

END OF SECTION

SECTION 31 37 00

RIP RAP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This work includes providing slope or erosion protection where shown on the drawings or where directed by the Design Professional. This work includes all necessary excavation and disposal of excavated material. A protective riprap covering of the type shown on plans shall be constructed on a prepared foundation, including headers along the edges of the slope protection, when specified. Unless otherwise noted, all riprap shall be installed over a geotextile liner. Slope protection may be of the following types:
   1. Plain Riprap.

1.02 RELATED WORK

A. Section 31 23 01 - Excavating, Filling and Grading.

B. Section 31 25 00 - Soil Erosion and Sedimentation Control.

1.03 REFERENCES

A. Michigan Department of Transportation 2020 Standard Specifications for Construction.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS

A. Plain Riprap:
   1. Stone for plain riprap shall be sound, tough, durable broken rock, free from structural defects or solid precast concrete blocks. Sound pieces of broken concrete may be used in place of stone when approved by the Owner. Individual stones or pieces of broken concrete shall measure at least eight inches in one dimension and shall have a volume of not less than 1/3 cubic foot, except that smaller pieces may be used for filling spaces between the riprap stone. Broken concrete with projecting reinforcement or rounded boulders or cobblestones shall be used.

B. Geotextile Liner:
   1. Geotextile material shall be non-woven and designed for use for erosion control with riprap or similar applications.
   2. Geotextile fabric shall meet the following physical requirements:

Physical Property	Test Method	Requirements for Riprap (except Heavy)	Requirements for Heavy Riprap
Grab Tensile Strength (minimum)	ASTM D4632	200 pounds	270 pounds
Trapezoid Tear Strength (minimum)	ASTM D4533	75 pounds	100 pounds
Puncture Strength (minimum)	ASTM D4833	75 pounds	100 pounds
Mullen Burst Strength (minimum)	ASTM D3786	200 pounds	400 pounds
Permittivity	ASTM D4491	0.5 per second	0.5 per second
Apparent Opening Size (maximum)	ASTM D4751	0.21 mm	0.21 mm

PART 3 EXECUTION

3.01 PREPARATION OF SUBGRADE FOR SLOPE PROTECTION

A. The subgrade shall be formed by trenching or filling to the required elevation for the bottom of riprap. The subgrade shall be thoroughly tamped or otherwise compacted to ensure its stability and trimmed to the necessary tolerances. The subgrade shall be compacted to at least 90% of its maximum unit weight.

3.02 PLAIN RIPRAP

A. The bank on which the plain riprap is to be placed shall be trimmed to a uniform slope as shown on the plans. A geotextile liner shall be installed on the subgrade.

B. The riprap shall commence in a trench below the toe of the slope, and shall progress upward, with each stone being laid by hand and firmly bedded into the slope and against the adjoining stones. The stones shall be laid perpendicular to the slope with the surfaces in contact and with well broken joints. The riprap shall be thoroughly compacted as the construction progresses, and the finished surface of the riprap shall present an even, tight surface. The thickness of the riprap other than precast concrete blocks, shall not be less than ten inches, measured perpendicular to the slope. Individual stones shall be laid with their ten inch minimum dimensions perpendicular to the plane of the surface to be riprapped.

C. When completed, the geotextile liner shall not be visible.

END OF SECTION

SECTION 32 11 24
AGGREGATE BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This specification describes the requirements for constructing an aggregate base under a proposed bituminous surface.

1.02 REFERENCES

A. 2020 Michigan Department of Transportation Standard Specifications for Construction.

1.03 RELATED REQUIREMENTS

A. Section 31 23 01 - Excavation, Filling and Grading.

B. Section 32 12 16 - Asphalt Paving.

1.04 QUALITY ASSURANCE/QUALITY CONTROL

A. Soil and Aggregate Density Testing
   1. Maximum Density of Granular Soils (loss by washing < 10%) and Aggregate
      a. The maximum density will be determined by the One Point Michigan Cone Test, as described in the Michigan Department of Transportation Density Control Handbook.
   2. Maximum Density of Cohesive Soils (loss by washing > 10%)
      a. The maximum density will be determined by the One Point T-99 Test, as described in the Michigan Department of Transportation Density Control Handbook.
   3. Density of In-Place Soils or Aggregate
      a. The in-place density of soils or aggregate will be determined by the Density In-Place (Nuclear) Test, as described in the Michigan Department of Transportation Density Control Handbook.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate shall meet the requirements of Series 21AA limestone aggregate, as described in the 2020 Michigan Department of Transportation Standard Specifications for Construction, unless otherwise noted on the plans, proposal or specifications.

B. Crushed concrete and gravel are **NOT** acceptable for the aggregate base material.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. Aggregate shall not be placed until the subgrade is properly prepared. The subgrade shall be graded to the required elevations and shape for placement of the specified aggregate thickness. The subgrade shall be compacted to at least 95 percent of its maximum unit weight. Soft or yielding spots shall be excavated and replaced with sound material.

3.02 PLACEMENT

A. Aggregate shall be placed in a manner that provides a uniform cross section of the specified thickness and the required surface grades. The edges of the area of aggregate surface shall straight and uniform.

B. Aggregate shall be placed in lifts not exceeding eight inches (loose measure) and compacted to at least 95 percent of its maximum density.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single course bituminous concrete paving.

1.02 RELATED REQUIREMENTS

A. Section 32 11 24 - Aggregate Base.

1.03 REFERENCE STANDARDS

A. AI MS-2 - Asphalt Mix Design Methods; 2015.

B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

D. Michigan Department of Transportation 2020 Standard Specifications for Construction.

E. Michigan Testing Methods (MTM).

F. Michigan Department of Transportation HMA Production Manual.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan Highways standard.

B. Mixing Plant: Conform to State of Michigan Highways standard.

C. Obtain materials from same source throughout.

D. Soil and Aggregate Density Testing
   1. Maximum Density of Granular Soils (loss by washing < 10%) and Aggregate
      a. The maximum density will be determined by the One Point Michigan Cone Test, as described in the Michigan Department of Transportation Density Control Handbook.
   2. Maximum Density of Cohesive Soils (loss by washing > 10%)
      a. The maximum density will be determined by the One Point T-99 Test, as described in the Michigan Department of Transportation Density Control Handbook.

E. Density of In-Place Soils or Aggregate
   1. The in-place density of soils or aggregate will be determined by the Density In-Place (Nuclear) Test, as described in the Michigan Department of Transportation Density Control Handbook.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.06 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

1.07 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. The Contractor shall submit material source and mix designs to the Design Professional for approval prior to the start of construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D946.

B. Aggregate for Leveling and Wearing Course: Angular crushed washed stone; free of shale, clay, friable material and debris.

1. Mix Designation: 13A, Graded in accordance with ASTM C136 and State of Michigan Highway Standards, within the following limits:
    a. 2 inch sieve: 100 percent passing.
    b. 1 inch sieve: 100 percent passing.
    c. 3/4 inch sieve: 100 percent passing.
    d. 1/2 inch sieve: 75 to 95 percent passing.
    e. 3/8 inch sieve: 60 to 90 percent passing.
    f. No. 4 sieve: 45 to 80 percent passing.
    g. No. 8 sieve: 30 to 65 percent passing.
    h. No. 16 sieve: 20 to 50 percent passing.
    i. No. 30 sieve: 15 to 40 percent passing.
    j. No. 50: 10 to 25 percent passing.
    k. No. 100 sieve: 5 to 15 percent passing.
    l. No. 200: 3 to 6 percent passing.
    m. Crushed (min), % (MTM 117): 25.
    n. Soft Particle (max), %: 8.0.
        1) The sum of the shale, siltstone, structurally weak and clay-ironstone particles must not exceed 8.0 percent for aggregates used in the wearing course. The sum of the shale, siltstone, structurally weak and clay-ironstone particles must not exceed 12.0 percent for aggregates used in the leveling course.
    o. Angularity Index (min): 2.5.
        1) The fine aggregate angularity of blended aggregates, determined by MTM 118, must meet the minimum requirement. In mixtures containing recycled asphalt products (RAP), the required minimum fine aggregate angularity must be met by virgin material. NAA fine aggregate angularity must be reported for information only and must include the fine material contributed by RAP if present in the mixture.
    p. L.A. Abrasion (max), % loss (c): 40.
        1) Los Angeles abrasive maximum loss must be met for the comp-osite mixture, however, each individual aggregate must be less than 50.
    q. Sand Ratio (max): 50.
        1) Sand ratio: No more than 50% of the material passing the No. 4 sieve is allowed to pass the No. 30 sieve.

C. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

D. Tack Coat: Homogeneous, medium curing, liquid asphalt.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Use dry material to avoid foaming. Mix uniformly.

B. Wearing Course: 4 to 11 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

C. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EQUIPMENT

A. Equipment shall meet the requirements of Section 501.03 of the 2020 Michigan Department of Transportation Standard Specifications for Construction.

3.02 SAMPLING AND TESTING

A. The Contractor shall submit to the Design Professional for approval the rate at which the HMA will be sampled. Samples will be obtained using the “Mini-stockpile” method in accordance with MTM 324.

B. Quantitative Extraction of Bitumen from HMA Paving Mixtures (MTM 325) will be used to determine the asphalt content of the HMA mixture.

C. The Contractor is responsible for HMA testing.

D. The Contactor shall submit test results to the Design Professional within seven days of HMA placement.

E. At the Design Professional's discretion, original samples of asphalt binder will be taken by the Contractor and delivered to the Design Professional prior to incorporation into the mixture. The frequency of sampling will be determined by the Design Professional. The cost of obtaining and delivering the samples to the Design Professional will be included in the HMA pay item(s). The Contractor must certify, in writing, that the materials used in the HMA mixture are from the same source as the materials used in developing the HMA mixture design and the bond coat is from an approved supplier, as stated in the Material Quality Assurance Procedures Manual.

3.03 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.04 PREPARATION

A. Aggregate Base (for pavements constructed on an aggregate base).
   1. See Section 32 11 24 - Aggregate Base.
   2. Unless noted otherwise, minimum aggregate base under asphalt paving shall be 6 inches.
   3. An aggregate base, of the thickness shown on the plans, shall be constructed on a prepared subgrade. The subgrade shall be free of unstable or yielding soils or organic material and shall be compacted to at least 95 percent of its maximum unit weight. Unstable, yielding, and organic soils shall be excavated and replaced with suitable soil.
   4. The aggregate base shall be placed in lifts not less than three inches nor more than eight inches and compacted to at least 95 percent of its maximum unit weight. The finish grade of the aggregate shall be graded and shaped to the dimensions and elevations required within a tolerance of 3/4 inches.

B. Removal of Existing Pavement Surface
   1. Edge Trimming
      a. Where the edge of an existing bituminous pavement is required, the bituminous pavement shall be cut its full depth in a manner that provides a vertical, straight edge.

3.05 BOND COAT

A. Bond coat shall be applied to existing pavement surfaces, only when they are clean and dry. Bond coats shall be uniformly applied to the pavement surface with a pressure applicator. Bond coat shall be placed in advance of HMA placement to provide for its curing prior to HMA placement.

B. Bond coat shall not be allowed to pool on the surface; pooling shall be removed. The adjacent pavement surfaces which are not to be overlaid shall not be sprayed with bond coat.

C. Bond coat shall be applied to each layer of the HMA pavement, and to the vertical edges of the adjacent pavements before placing subsequent courses.

3.06 TRANSPORTATION OF HMA

A. HMA shall be transported to the project site in accordance with the requirements of Section 501.03.E, of the 2020 Michigan Department of Transportation Standard Specifications for Construction.

B. Each load of HMA delivered to the project site shall be weighed on an approved scale with automatic print out system. Weights shall be measured to the nearest 20 pounds. Scales and print out systems shall meet the requirements of Section 109 of the 2020 Michigan Department of Transportation Standard Specifications for Construction.

3.07 PLACING ASPHALT PAVEMENT - DOUBLE COURSE AND SINGLE COURSE

A. HMA shall be placed in accordance with the requirements of Section 501.03.F, of the 2020 Michigan Department of Transportation Standard Specifications for Construction.

B. Place Leveling and Wearing Courses to thicknesses indicated in the Schedule.

3.08 ROLLING

A. HMA shall be rolled in accordance with the requirements of Section 501.03.G, of the 2020 Michigan Department of Transportation Standard Specifications for Construction.

3.09 WEATHER AND SEASONAL LIMITATIONS

A. The contractor shall not place bond coat or HMA when precipitation is imminent or when there is moisture on the existing surface to be overlaid.

B. HMA shall not be placed when the underlying base is frozen.

C. Unless otherwise approved, HMA shall not be placed before May 15 or after November 15.

3.10 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.11 FIELD QUALITY CONTROL

A. See Construction Manager's General Requirements for testing requirements.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.12 PROTECTION

A. The contractor shall protect surfaces, structures, signs, poles, vehicles, and other items adjacent to the area to be paved from being discolored or damaged. Damaged items shall be corrected at the contractor's expense. The Contractor shall protect the newly placed HMA surface from damage by traffic and construction activities.

B. Immediately after placement, protect pavement from mechanical injury for two (2) days or until surface temperature is less than 140 degrees F.

3.13 SCHEDULE

A. Pavement at Walk Paths: Single Course of 4 inches compacted thickness.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks.

B. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 31 23 01 - Excavating, Filling, and Grading.

C. Section 32 12 16 - Asphalt Paving.

1.03 REFERENCE STANDARDS

A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High-Density Concrete - Guide; 2022.

B. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

C. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

D. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

E. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

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

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

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

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

J. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2023.

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

L. ASTM C173/C173M – Standard Test Method for Air Content of Freshly Mixed Content by the Volumetric Method; 2016.

M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

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

O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).

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

Q. Michigan Department of Transportation 2020 Standard Specifications for Construction.

1.04 SUBMITTALS

A. See Construction Manager’s General Requirements for submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, curing compound, and detectable warning plate.

C. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.

D. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Design Professional to review.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615 Grade 80; deformed billet steel bars; unfinished finish.

B. Steel Welded Wire Reinforcement: Plain type, ASTM A1064; in flat sheets; unfinished.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150 Normal - Type I portland type, grey color.

B. Coarse Aggregate: Shall meet the requirements of Class 6A aggregate as described in the 2020 Michigan Department of Transportation Standard Specifications for Construction.

C. Sand for Base: Shall meet the requirements of Granular Material Class III, as described in the 2020 Michigan Department of Transportation Standard Specifications for Construction.

D. Water: Clean, and not detrimental to concrete.

E. Air-Entraining Admixtures: ASTM C260.

F. Chemical Admixtures: ASTM C494, Type A - Water Reducing, Type C - Accelerating, and Type G - Water Reducing, High Range and Retarding.
   1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.04 ACCESSORIES

A. Curing Compound: White membrane curing compound shall conform to ASTM C309, Type 2. Curing compound shall be agitated to provide a uniform consistency prior to transfer between containers or before application.

B. Surface Retarder: Medium viscosity, liquid type, color as selected from manufacturer's standard range. Provide product equivalent to "RHEOFINISH 288FD manufactured by Degussa.

C. Joint Sealer: Single component, self-leveling, polyurethane sealant.
   1. Material: ASTM C920, Type S, Grade P, Class 25, use T, NT, M, O G, I.
   2. Color: Limestone.
   3. Application Temperature: 40 to 100 degrees F.
   4. Product: "SIKAFLEX-1c SL" manufactured by Sika Corporation: www.sikaconstruction.com.
   5. Substitutions: Products manufactured by others that meet or exceed this specification may be considered if the request is submitted within the parameters outlined in the bidding documents.

2.05 MIXTURES

A. Concrete shall be transit mixed concrete in accordance with ASTM C94.

B. Admixtures: Add acceptable admixtures at rates recommended by manufacturer.

C. Concrete Properties:
   1. Compressive Strength at 28 days: 3,500 psi.
   2. Water-Cement Ratio: Maximum 45 percent by weight.
   3. Total Air Content: 6 percent.
   4. Maximum Slump: 3 inches.
   5. Maximum Aggregate Size: 3/4 inch.

PART 3 EXECUTION

3.01 COORDINATION OF TRAFFIC

A. Hazardous areas shall be barricaded to protect pedestrian and vehicular traffic.

B. Work shall be scheduled so that access is maintained to driveways and entrances through the project area to the extent possible. Where a driveway or entrance must be closed for a period, the OWNER shall be notified in advance of the closing.

3.02 REMOVAL OF EXISTING SIDEWALK, CURB AND GUTTER, AND PAVEMENT

A. Where an existing sidewalk, curb and gutter, and/or pavement are to be removed and replaced, the existing structure shall be removed in accordance with Section 02 41 13.13 – Pavement Removal.

3.03 PREPARATION

A. The base shall be excavated, filled, and shaped as required to construct pavement of the required thickness at the proposed grades and alignment. The base shall be compacted to at least 95% of its maximum unit weight. Soft and yielding soils shall be excavated and replaced with suitable soils.

B. Concrete may be placed by slipforming, unless indicated otherwise.

C. Where forms are used, the forms shall extend the full depth of the concrete. Forms shall be of sufficient strength and staked to prevent springing or yielding after placement of concrete. Flexible forms capable of making a smooth arc shall be used for curved sections. Face forms for the exposed face of curb are not required.

D. Where steel reinforcement is used, it shall be spliced and held in place in a manner approved by the Design Professional. Splices shall be overlapped by ten inches.

3.04 REQUIRED GRADES

A. Sidewalks shall be constructed with a maximum transverse slope of 1/2 inch per foot. Transverse slopes shall be at least 1/4 inch per foot, unless longitudinal drainage is provided. The longitudinal slope of sidewalk and ramps shall not exceed one inch per foot.

3.05 PLACEMENT OF CONCRETE

A. Concrete shall not be placed until the forms (or grade, if the concrete will be slipformed) have been inspected by the Design Professional.

B. The base shall be moistened just prior to placement of the concrete.

C. Concrete shall have a temperature between 45 and 90 degrees F, at the time of placement.

D. Concrete shall be deposited to the proper depth and spaded or vibrated to ensure proper consolidation. Concrete shall be placed and finished in a continuous operation.

E. Any material required to fill low spots shall be obtained from the mixture used in the work. Exposed surfaces of the concrete slab shall be finished smooth and even by means of a moistened wood float. Sidewalk and pavement slabs shall be lightly brushed perpendicular to the normal direction of traffic. Water shall not be added to the concrete surface as an aid to finishing. The top edges of the slab and all transverse joints shall be rounded with a finishing tool having a radius of 1/4 inch. Surfaces shall not vary more than 3/8 inch from the alignment and typical cross section.

F. Joints shall be constructed perpendicular to surfaces and shall not vary more than 1/4 inch from their designated position. Transverse plane-of-weakness joints in curbs and pavement shall be placed at intervals not exceeding ten feet. Transverse plane-of-weakness joints in sidewalk shall be placed at spacing equal to the width of the sidewalk, except as follows:

G. Where the sidewalk abuts an existing sidewalk, joints shall coincide.

H. Joint spacing shall not exceed six feet.

I. In irregularly shaped areas, joints shall be perpendicular as much as possible.

J. Individual slab size shall be between 16 square feet and 36 square feet, as much as possible.

K. Where the pavement or sidewalk is irregularly shaped, joints shall be perpendicular as much as possible.

L. Expansion joints shall be constructed using 1/2 inch fiber joint filler as follows:
   1. At intervals not exceeding fifty feet.
   2. At fixed objects such as curbs, sidewalks, manholes and drain inlets, poles, and buildings.
   3. At intersections and changes in direction.

M. Expansion joint filler shall extend the full depth of the concrete, with the top of the filler material just below the finished concrete surface.

N. Exposed concrete surfaces shall be cured using white membrane curing compound applied uniformly at a rate of 200 square yard per gallon. Curing compound shall be applied regardless of temperature or humidity conditions.

O. Finishing:
   1. Area: Light broom, texture perpendicular to pavement direction.
   2. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

3.06 PROTECTION

A. Concrete shall not be placed if the air temperature is not at least 25 degrees F and rising or more than 90 degrees F. Concrete shall be protected from damage caused by freezing or rain.

B. The Contractor shall provide sufficient barricading and security to protect fresh concrete from accidental damage or vandalism. Damaged concrete shall be removed to a joint and replaced at the Contractor's expense.

3.07 CLEANUP

A. After the concrete has attained sufficient strength, the forms shall be removed.

B. Where adjacent areas are turf, the area next to the pavement shall be backfilled with sound earth and topsoil and graded so the surface is about one inch below the pavement or as necessary to provide proper drainage.

END OF SECTION

SECTION 32 92 18

LAWN RESTORATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of soil within disturbed lawn area, seed and fertilizer.

B. Maintenance.

1.02 QUALITY ASSURANCE

A. Hydroseeding: Company specializing in landscaping and lawn maintenance.

1.03 MAINTENANCE SERVICE

A. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

B. The contractor is responsible to provide turf, substantially free of bare spots and free of weeds. The ground in turf areas shall be smooth, graded to provide positive drainage, and graded to provide a smooth transition to adjacent areas. The Design Professional will determine when the requirements of guaranteed growth and smooth ground surface have been met.

C. Materials, requirements, and methods described in this specification are provided to establish minimum levels. Where the Contractor believes that other materials or methods are appropriate for the specific site conditions or better suited to the contractor's schedule, the contractor shall submit details of the alternative materials and/or methods to the Design Professional for approval.

D. The contractor shall provide re-seeding, watering, and herbicides as necessary to achieve the desired results.

E. There will be no adjustment in project cost for re-seeding, watering, application of herbicides, or using alternative methods of turf establishment.

PART 2 PRODUCTS

2.01 GRASS MATERIALS

A. Seed Mixture:
   1. 30% Merritt Kentucky Bluegrass
   2. 30% Newport Kentucky Bluegrass
   3. 30% Pennlawn Fescue
   4. 10% Perennial Ryegrass

2.02 SOIL AND SOIL ENHANCEMENT MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, free of subsoil, clay or impurities, plants, weeds and roots.

B. Fertilizer (Areas receiving hydroseeding): Fifty percent of the elements derived from organic sources, of proportions necessary to eliminate any topsoil deficiencies.

2.03 MULCH MATERIALS

A. Straw, hay, wood chips, wood excelsior fiber or other material is suitable. All mulch must be substantially free of noxious weed seeds and objectionable foreign material. Rotten or partially-decayed straw or hay is not acceptable. Short-stemmed straw is not acceptable for crimping purposes but should work well for tacking.

B. Straw or hay used for mulch shall be in an air-dry condition. As a guide, any straw or hay having 10% or less of moisture will be considered air-dry. Generally, baled hay or straw coming from sheds, barns, under tarps or even interiors of stacks will be air-dry unless exposed to rain prior to shipping.

2.04 EQUIPMENT

A. Equipment used in mulching operations should be specifically designed for applying or crimping mulch. Equipment of inadequate capacity, jerrybuilt, or poor design, badly worn or malfunctioning is not acceptable.

B. Straw or hay mulch shall be applied with a mulch blower. The mulch blower is equipped with a nozzle for directional application of the mulch.

C. A mulch tiller is used for crimping mulch. An agricultural disc is not a mulch tiller. A mulch tiller has flat, notched disks, whereas a farm disk has curved smooth disks and is designed to turn over soil. An agricultural disk should not be used for crimping mulch because it will bury the mulch rather than pressing it into the soil.

PART 3 EXECUTION

3.01 PLACING TOPSOIL

A. Scarify seed bed areas to depth of 4 to 6 inches.

B. Remove all stones, weeds, brush, roots and other debris greater than one (1) inch in size.

C. Spread 2 inches of approved topsoil in areas where lawn restoration is required and disc into subsoil thoroughly. Uniformly spread additional 2 inches of topsoil over seed bed area and rake smooth.

D. Fine grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage. Bring finish grade flush with edge of surface paving, walks and curbs.

E. Lightly compact placed topsoil.

3.02 SEEDING

A. Apply seed at a rate of 5 lbs. per 1000 square feet evenly in two intersecting directions. Lightly rake and roll seed area.

B. Immediately following seeding, apply agricultural mulch to a thickness of 1-1/2 inches and machine-crimp into soil.

C. Apply water with a fine spray immediately after each area has been mulched.

3.03 HYDROSEEDING

A. Hydroseed with a slurry mix at a rate of 1000 gallons per acre.

B. Each 1000 gallons of slurry mix shall contain 1500 lbs. of approved cellulose fiber, 500 lbs. of an approved 12/12/12 commercial fertilizer and 220 lbs. of the specified seed mixture.

C. Slurry mix shall be applied with a pump, rated and operated at not less than 100 gpm and not less than 100 psi. Pump shall be equipped with mechanical agitator for uniform suspension and distribution of seed, fertilizer and cellulose fibers in water.

END OF SECTION

SECTION 33 31 00

SANITARY SEWER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The Contractor shall supply all labor, material and equipment required for the installation and testing of gravity sanitary sewers and appurtenances in compliance with these general specifications, project specifications and the contract drawings.

1.02 RELATED REQUIREMENTS

A. Section 31 23 01 - Excavating, Filling and Grading.

B. Section 32 92 18 - Lawn Restoration.

1.03 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data on pipe, fittings, joint material, pipe bedding and backfill materials.

1.04 REFERENCES

A. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120; 2021a.

B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewere and Other Gravity-Flow Applications; 2025.

C. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).

D. MDOT Standard Specifications for Construction; 2020 Edition.

E. Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

1.05 QUALITY ASSURANCE/QUALITY CONTROL

A. Grade and Alignment:
   1. Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100 foot intervals. The Contractor shall report as-constructed measurements to the Design Professional.

B. Acceptance Tests:
   1. The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Plumbing Inspector (and Owner’s representative).
      a. Leakage Tests:
         1) Sewers less than 24" in diameter shall be subject to a low pressure air test. The low pressure air test shall be completed in accordance with Section 3.10.C.
      b. Physical Inspection:
         1) The physical inspection shall be completed in accordance with Section 3.10.E.
      c. Deflection Testing:
         1) All plastic sewers shall be subjected to a deflection test in accordance with Section 3.08.C.

PART 2 PRODUCTS

2.01 MATERIALS

A. All material supplied shall be new and shall be designed and guaranteed to perform the service required.

B. Pipe:
   1. Pipe shall be of the material, class and/or thickness indicated on the plans or on the proposal. If no specific materials or classes are provided on the plans or on the proposal, any of the following pipe materials are permissible.

C. PVC Pipe:

1. All PVC pipe shall be ASTM 3034 gasketed sewer pipe with a SDR of 26 or lower. PVC pipe conforming to ASTM D1785 schedule 40 and ASTM D2665 is acceptable for 6" service leads.

D. Drop Connections:
   1. Pipe and fittings for drop connections shall be PVC.

2.02 MATERIAL TESTING

A. All materials to be incorporated in the construction of gravity sewers and appurtenances shall be subject to inspection and tests as specified by ASTM or AWWA references. The Owner reserves the right to subject any material supplied for a particular project to an independent testing laboratory. Such tests if scheduled shall be paid for by the Owner. The results of such tests shall be the basis of material acceptance.

B. The Contractor shall supply the Owner with shop drawings, a certificate of compliance or actual test results stating that the material to be used is in conformance with the specifications prior to using material for construction.

PART 3 EXECUTION

3.01 GENERAL

A. Sewers shall be constructed in accordance with the following standards, except as modified in this specification:
   1. Plastic Pipe: ASTM D2321.

3.02 EXCAVATION

A. Excavation shall be completed in accordance with Section 31 23 01.

3.03 PIPE ALIGNMENT

A. It shall be the Contractor's responsibility to transfer the line and grade to the bottom of the excavation for pipelaying. Lasers shall be used for pipelaying.

B. It shall be the Contractor's responsibility to protect the original survey control and benchmarks as set by the Design Professional.

3.04 PIPE LAYING

A. Each pipe shall be laid on an even, firm bed, so that no uneven strain will come to any part of the pipe. Particular care shall be exercised to prevent the pipes bearing on the sockets. Bell holes for bell and spigot pipe shall be dug at each point as specified before. Each pipe shall be laid in the presence of the inspector. The bell-end of the pipe shall be laid up-grade. Pipelaying shall proceed in the upstream direction, except where otherwise approved by the Design Professional.

B. The interior of the sewer shall be cleaned of all dirt, debris, jointing material and other materials.

C. All pipe shall be completely pushed to the “home” position.

D. Pipes laid in tunnel or casing pipe shall be supported on suitable blocks cut or grouted into position to place the invert of the sewer or drain at the slope and to the elevations indicated on the contract drawings.

3.05 PIPE JOINTS

A. In all jointing operations the trench must be dewatered when joints are made. Bell and spigot, or tongue and groove ends of the pipe shall first be wiped clean before actual jointing operations are started.

B. Joints between consecutive bell and spigot or tongue and groove pipe shall be made with a rubber gasket. The gasket shall be fitted over the tongue or spigot of each pipe, as recommended by the manufacturer, and the pipe entered into the bell or groove and shoved home.

C. PVC Joints
   1. All PVC pipe shall be joined with rubber compression gaskets that are factory installed. The joint shall be lubricated and joined so the “home” mark on the pipe is flush with the bell end.

3.06 BACKFILL

A. Backfill shall meet the requirements of Section 31 23 01.

3.07 MISCELLANEOUS PIPE REPAIRS

A. When an existing sewer pipe, drain pipe, field tile or other existing pipe is damaged as a result of construction activities and is not designated for removal or abandonment on the plans or by the Design Professional, it shall be repaired by the Contractor.

B. The section of damaged pipe shall be removed to existing joints or to sawed joints. The removal shall be completed to a point where the pipe is sound and undamaged. A length of new pipe of the same size as the original pipe shall be furnished and installed to replace the section of pipe removed. The new pipe may be any one of the following materials:

C. Same material, class or thickness as the original pipe

D. PVC Schedule 40, for pipes 8 inches or less in diameter

E. PVC DR 26, for pipes 8 inches or greater in diameter

F. Other pipe material approved by the Design Professional

G. Each end of the new section of pipe shall be connected to the remaining sections of existing pipe using a rubber gasketed sleeve, suitable for the pipe materials and sizes being joined, to provide a watertight connection. The repaired section of pipe shall be firmly bedded in sand or stone, compacted to at least 95% of its maximum unit weight.

3.08 ACCEPTANCE TESTS - SANITARY SEWERS

A. The methods of testing shall be approved by the Design Professional. The contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed sanitary sewer. The Design Professional shall determine when grouting or relaying of faulty pipe is required.

B. Air Testing:

1. Sewers less than 24” in diameter shall be subjected to an air test. The contractor shall furnish all necessary labor, equipment and supervision to perform the required air testing. The testing of PVC pipe sewer shall conform to ASTM F1417. The testing of concrete pipe sewer shall conform to C924. The testing of vitrified clay pipe sewer shall conform to ASTM C828.
2. The Contractor shall be required to furnish the Owner with acceptable air test results for each segment of sanitary sewer. All testing shall be monitored by the Plumbing Inspector.
3. The procedure for air testing of sewers shall be as follows:
   a. The sewer shall be pressurized to 4 PSIG, plus sufficient pressure to equal the force exerted by ground water over the pipeline. At least 2 minutes shall be allowed for the air pressure to stabilize between 3.5 and 4 PSIG. If necessary, air shall be added to the sewer to maintain a pressure of 3.5 PSIG or greater.
   b. After the stabilization period, the air supply control valve shall be closed so that no more air will enter the sewer. The sewer air pressure shall be noted and timing for the test begun. The test shall not begin if the air pressure is less than 3.5 PSIG, or such other pressure as is necessary to compensate for ground water level.
   c. The time required for the air pressure to decrease 1.0 PSIG during the test shall not be less than the time shown in the following table:

PIPE DIAMETER (inches)	MINUTES
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

4. If a sewer fails to pass any of the previously described tests, the Contractor shall determine the location of the leaks, repair them and retest the sewer. The tests shall be repeated until satisfactory results are obtained.

C. Deflection Testing:
   1. All sanitary sewers constructed using plastic pipe shall be subjected to a deflection test. The Contractor shall furnish all labor, materials, and equipment necessary to perform deflection testing. The testing shall be completed after the pipeline has been backfilled for a period of at least 30 days. The pipeline shall be tested with a rigid ball or mandrel having at least seven points, and having a diameter of not less than 95% of the average inside diameter of the pipe being tested. The average diameter for the pipe will be as specified by the ASTM specification for the pipe material, class and size. Where testing indicates that the pipe deflection exceeds five percent of the pipe diameter, the pipe shall be removed and replaced. Pipe that is replaced shall be re-tested at least 30 days following its replacement.
   2. Deflection testing shall be performed in the presence of the Design Professional. The Contractor shall provide the Design Professional with a least two working days' notice of conducting deflection testing.

END OF SECTION

SECTION 33 44 01

STORM SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This work includes construction of pipe storm sewers, drainage structures, and appurtenances. Drainage structures include manholes and covers.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-In-Place Concrete: Concrete for headwall.

B. Section 31 25 00 - Soil Erosion and Sedimentation Control.

C. Section 31 23 01 - Excavating, Filling and Grading.

D. Section 32 92 18 - Lawn Restoration.

1.03 REFERENCES

A. AASHTO HB - Standard Specifications for Highway Bridges; 2005, with Errata.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.

C. ASTM C55 - Standard Specification for Concrete Building Brick; 2023.

D. ASTM C478/C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections; 2026.

E. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants; 2009 (Reapproved 2019).

F. ASTM C1634 - Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units; 2023a.

G. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

H. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2025.

I. 2020 Michigan Department of Transportation Standard Specifications for Construction.

J. Michigan Department of Transportation Standard Plans

K. Where references are made to the Michigan Department of Transportation (MDOT) Standard Plans, and copies of specific Standard Plans are not included as part of the Contract Documents, the reference is considered to be to the MDOT Standard Plan in effect at the time the project is issued for bidding. Copies of MDOT Standard Plans can be obtained form the MDOT website.

1.04 SUBMITTALS

A. See Construction Manager's General Requirements for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Project Record Documents:
   1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

A. Plastic Pipe:
   1. Provide products that comply with applicable code(s).
   2. Plastic Pipe: ASTM D1785, Schedule 40, Poly Vinyl Chloride (PVC) material; bell and spigot style solvent sealed joint end.

B. Pipe Accessories:
   1. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 CONCRETE MANHOLES

A. Weight Rating: H 10 according to AASHTO HB.

B. Precast Concrete Manholes: Comply with ASTM C478/C478M, reinforced.
   1. Wall Thickness: 6 inches.
   2. Base Thickness: 12 inches.
   3. Reinforcement: Formed steel wire, galvanized finish, wire diameter as indicated on drawings.
   4. Joint Sealant: Comply with ASTM C990.

C. Grade Adjustments:
   1. Concrete Bricks: ASTM C1634 or ASTM C55 Grade N, cored, normal weight.

D. Frame and Cover: Cast iron construction, ASTM A48/A48M Class 30B, machined flat bearing surface; removable lid, closed lid design; sealing gasket; lid molded with identifying name.

E. Manhole Steps: Formed galvanized steel rungs; 3/4 inch diameter. Formed integral with manhole sections.

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavation shall be completed in accordance with Section 31 23 01.

3.02 PIPELAYING

A. Sections of sewer pipe shall be carefully laid in the prepared trench, bell ends upgrade, with the spigot end fully entered in the adjacent bell. Each section shall have firm bearing throughout its length and shall be substantially true to the line and grade required. The use of blocks to bring sections to grade will not be permitted.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Laypipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to building storm drainage system.

E. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

F. Sewers shall be reasonably free of accumulation of silt debris and other foreign matter at the time of final acceptance.

3.03 DRAINAGE STRUCTURES INSTALLATION

A. Establish elevations and pipe inverts for inlets and outlets as indicated in drawings.

B. Precast Concrete Manholes:
   1. Place base section plumb and level.
   2. Install joint sealant uniformly around section lip.
   3. Overlay additional sections on joint sealant.
   4. Install cone or lid plumb and level on joint sealant.

C. Grade Adjustments:
   1. Lay brick or masonry units uniformly on mortar bed with full head joints, running bond. Top with mortar, plumb and level.
   2. Place adjacent materials tight, and smooth following design grades.

D. Frames and Covers:
   1. Place frame plumb and level.
   2. Mount frame on mortar bed at indicated elevation.
   3. Place grate in frame securely.

E. Pipe or tile connections to concrete drainage structures shall extend through the structure wall and be cut flush with the inside surface. The opening around the pipe shall be neatly filled with mortar to prevent leakage.

F. Cover elevations given on the plans are for information only. The final elevation will be determined in the field, based on as-constructed conditions. The Design Professional will determine the elevation curves are to be set at once final grading is completed.

G. Drainage structures shall be maintained reasonably free of accumulations of silt, debris, and other foreign matter at the time of final acceptance.

3.04 BACKFILL

A. Backfill shall meet the requirements of Section 31 23 01.

END OF SECTION