

Barton

Malow

Design/Construction Services

**Troy School District
2004 Bond Program
Troy, MI**

**Athens High School
Concessions Renovations
Bid Package # 9393**

PROJECT MANUAL

**Issue Date: February 14, 2007
Pre-Bid Conference: February 21, 2007 @ 3:00PM
Bid Due Date: March 20, 2007 @ 3:00PM**

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Barton Malow Company

Troy School District

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**SECTION 00030
PROJECT MANUAL
INFORMATION AND IDENTITIES**

This Project Manual contains the Bidding and Contract Requirements for Troy School District – Athens High School Concessions’ Remodeling, Bid Package No. 9393 in Troy, Michigan. Review of this Manual is important in fulfilling the Contract Requirements. Any questions regarding this Manual or any of the Bidding or Contract Requirements should be directed to the Barton Malow Company.

PROJECT: Troy School District
2004 Bond Program
Athens High School Concessions’ Remodeling
Bid Package No. 9393

OWNER: Troy School District
4400 Livernois Road
Troy, MI 48098

Construction Manager: BARTON MALOW COMPANY
1301 Boyd
Troy, MI 48083
Andrea Wright, Assistant Project Manager
Phone: 248-823-4631
Fax: 248-823-4672
Email: andrea.wright@bartonmalow.com

ARCHITECT: Kingscott Architecture, Engineering, Interior Design
229 East Michigan, Suite 335
Kalamazoo, MI 49007-6403

**SECTION 00100
ADVERTISEMENT TO BID**

1. Barton Malow Company, requests Bid Proposals on behalf of Troy School District for the **Athens High School Concessions' Remodeling** for Bid Package No. 9393 work. Bid Proposals will be received by Troy School District, 1140 Rankin, Troy, MI 48098 delivery or mail, to the attention of Frank Lams by 3:00 p.m. local time on Tuesday, March 20, 2007. (The clock used for receiving bids is located at the Rankin office in Nancy Cryderman's area. The clock is linked to the TSD computer resource center). Proposals must be sealed with Bidder's name on the outside of the envelope and designated as follows:

Sealed Proposal
Athens High School Concessions' Remodeling
Bid Package No. 9393
Bid Category: _____
Contractor Name, Address, Phone Number

2. Proposals shall be based on the requirements set forth in the Project Manual by Barton Malow Company and Specifications and Construction Documents prepared by Kingscott Architects, Engineering, Interior Design dated December 1, 2006 for:

**BID PACKAGE NO. 9393, Athens High School Concessions' Remodeling
2004 Bond Program**

<u>Bid Category</u>	<u>Titles</u>
6.2	General Trades
15.1	Mechanical
16.1	Electrical

3. Accepted Bidders will be required, as a condition precedent to award of Contract, to furnish in the amount of 100% of the contract price, satisfactory Performance Bond and Payment Bond and Certificates of Insurance as required in the Project Manual.
4. Unless otherwise specifically set forth in Section 00880 of the Project Manual, this Project is subject to state sales and/or use taxes and Bidder is required to include such taxes in its Bid Proposal.
5. Barton Malow Company has been contracted by the Owner in the capacity of **Construction Manager**, for the Project, and as such has the rights and obligations set forth in its contract with the Owner for those services, and shall act as representative of the Owner to the extent required/allowed under its Owner contract.
6. Bid Proposals will be publicly opened immediately following receipt of bids by the Troy School District and Barton Malow Company, evaluated by Barton Malow Company, Owner and the Architect, with awards subsequently made by Troy School District, Barton Malow Company and Kingscott Architects, Engineering, Interior Design.

The Owner shall not open, consider, or accept a Bid Proposal that is received after the date and time specified for bid submission in this Advertisement for Bids.

7. Bidding Documents will be available for examination and distribution on or after Wednesday, February 14, 2007. Examination may be made at the following locations:

- Barton Malow Company Site Office, 1301 Boyd, Troy, MI 48083
- Construction Association of Michigan, 43636 Woodward Ave., Bloomfield, MI 48302
- F. W. Dodge, 21415 Civic Center Drive, Suite 115, Southfield, MI 48076

8. A **STRONGLY ENCOURAGED PRE-BID CONFERENCE** and site tour will be held for all trades at the Athens High School Concessions' Building (4333 John R., Troy, MI 48098), on **Wednesday, February 21, 2007, at 3:00 p.m.** All Bidders should plan to attend the pre-bid conference. Pre-bid conference minutes will be distributed to all attendees by Barton Malow Company. But, Barton Malow Company, the Architect and Owner are not responsible for providing information to those who do not attend the pre-bid conference. Information disclosed in the pre-bid conference minutes will be considered part of the Bidding and Contract Documents.
9. A deposit of **\$100** per document set is required. Deposit check should be made payable to the Troy School District. Each Bidder shall provide its shipper number for shipping fees if the Bidder desires to have plans sent by ground or air transportation. More than one set is available upon payment of printing and shipping costs. **Deposits will be refunded upon return of the Bidding Documents to the Barton Malow Company by May 1, 2007**, provided the Bidding Documents are returned complete, in clean and usable condition, and free of marks or other defacements. **DEPOSIT WILL NOT BE REFUNDED FOR DRAWINGS RETURNED AFTER May 1, 2007.** Successful Bidders shall retain their set of Bidding Documents and their deposits will be refunded upon execution of the Agreement.
10. Bid Proposals shall be on forms furnished by **Barton Malow Company in Section 00400**. Bidders will be required to submit with their Bid Proposals, a notarized Familial Relationship Disclosure Form furnished by **Barton Malow Company in Section 00410**, a Bid Security by a qualified surety authorized to do business in the State of Michigan where the Project is located, an OSHA Form 300 for the most recent completed year, their worker's compensation Experience Modification Rate (EMR) factor, and any other information required in the Instructions to Bidders. Bidders shall not withdraw Bid Proposals for a period of **ninety (90)** Days after date for receipt of Bid Proposals.
11. The successful Bidder(s) will be required to enter into an agreement with Troy School District on the Agreement Form identified in Section 00500 of the Project Manual.
12. The right to accept or reject any or all Bid Proposals, either in whole or in part, to waive any informalities or irregularities therein and to award the contract to other than the low bidder is reserved by Troy School District.
13. All Bid Proposals shall be accompanied by the sworn and notarized statement included in Section 00410 of the Project Manual, in accordance with MCL 380.1267, disclosing any familial relationship that exists between the owner(s) or any employee of the Bidder and any member of the School board or the superintendent of the School District. Bid Proposals that do not include this sworn and notarized disclosure statement will not be considered accepted.

BARTON MALOW COMPANY

**Troy School District
Andrea Wright
Assistant Project Manager**

END OF SECTION 00100

**SECTION 00200
INSTRUCTION TO BIDDERS**

PART 1 – DEFINITIONS

- 1.01 Capitalized terms used in this Project Manual shall have the meanings set forth below. If a capitalized term is used herein but not defined in this Section, 00200, Part 1, it shall have the meaning set forth in other applicable Contract Documents (such as the Agreement or Conditions of the Contract).
- 1.02 “**Addenda**” means the written and graphic instruments issued by the Architect and/or Barton Malow Company prior to the execution of the Agreement that modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.
- 1.03 “**Agreement**” means the document defined as such in Section 00500, including all other documents incorporated by reference in the Agreement.
- 1.04 “**An Alternate Bid**” (or “**Alternate**”) is an amount stated in the Bid Proposal to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- 1.05 “**Architect**” means the person or entity listed in Project Manual, section 00030 as such, and may include professional engineers if so designated.
- 1.06 “**Base Bid**” is the sum stated in the Bid Proposal for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added to or deducted from for sums stated in Alternate Bids.
- 1.07 A “**Bidder**” is a person or legal entity that submits a Bid Proposal in conformance with the Bidding Documents. After award of the Agreement, the Bidder will be referred to as **Contractor**: “**All Contractors on this project are considered prime/principal contractors**”.
- 1.08 “**Bid Categories**” are units of Work performed by a Contractor and its Subcontractors which form part of the total Project. The term “**Bid Category**” should not be confused with the term “**Technical Section**”. Technical Sections of the Specification (Division 2 through Division 17) establish quality and performance criteria, and the Bid Categories designate work scope and assignment.
- 1.09 A “**Bid Category Description**” is a written description of the scope of Work to be performed by a Bidder for a Bid Category. A description of the Work is provided in the Scope of Work for each Bid Category.
- 1.10 “**Bidding Documents**” means the Bidding Requirements, the Contract Documents, and the Resource Drawings collectively.
- 1.11 A “**Bid Package**” means a series of Bid Categories that are released for bidding in the same set of Bidding Documents.
- 1.12 “**Bidding Requirements**” include the **ADVERTISEMENT TO BID**, Instructions to Bidders, Information Available to Bidders, and Bid forms and supplements.
- 1.13 “**Bid Proposal**” is a complete and properly signed proposal to do the Work of an individual Bid Category (ies) for the sums stipulated therein, submitted in accordance with the Bidding Documents.
- 1.14 The “**Contract Documents**” consist of all Contracting Requirements set forth in Division 0 of this Project Manual, including, but not limited to, the Contract Forms (the Agreement, Performance/Payment Bonds, and Certificates), the Conditions of the Contract (General, Supplementary or Special), the Division 1- General Requirements of this Project Manual, the Specifications set forth in Division 2 through 17 of this

Project Manual, the Drawings, and all other documents incorporated into the Agreement by reference, all Addenda issued prior to and all modifications issued after execution of the Agreement.

- 1.15 “**Day**” means calendar day, unless otherwise defined in the particular Contract Document.
- 1.16 “**Hazard Communications Program**” means the **Contractor** own hazard communications program that will govern project safety for such **Contractor** Work and that must be submitted to Barton Malow Company by each successful Bidder before commencing Work. The Hazard Communications Program will be no less stringent than Section 00810 - On Site Safety and Loss Control Program included in the Bidding Documents. Each **Contractor** shall be fully responsible for the safety of its Work and the Work of its Subordinate Parties.
- 1.17 “**Hazardous Materials**” means asbestos; asbestos containing material; lead (including lead-based paint); PCB; molds; any other chemical, material, or substance subject to regulation as a hazardous material, hazardous substance, toxic substance, or otherwise, under applicable federal, state, or local law; and any other chemical, material, or substance that may have adverse effects on human health or the environment.
- 1.18 “**Lowest Responsive, Responsible Bidder**” means a Bidder whose Bid Proposal conforms in all material aspects to the terms, conditions, specifications and requirements of the solicitations and who has demonstrated the ability to properly perform the Work.
- 1.19 “**MBE/WBE/SBE**” means Minority Owned Business Enterprise/Women Owned Business Enterprise/ Small Business Enterprise as these terms are defined in the applicable ordinances and laws governing the Project. Refer to Project Manual, Section 00861 for more specific requirements.
- 1.20 “**Project Safety Program**” means the **Contractor** own site safety program that will govern project safety for such **Contractor** Work, and that must be submitted to Barton Malow Company by each successful Bidder before commencing Work. The Project Safety Program will be no less stringent than Section 00810 - On Site Safety and Loss Control Program included in the Bidding Documents. Each **Contractor** shall be fully responsible for the safety of its Work and the Work of its Subordinate Parties.
- 1.21 “**Resource Drawings**” are drawings that do not form a part of the Contract Documents and are included in the Bidding Documents as a courtesy only. The Bidder is not entitled to rely upon the accuracy of the Resource Drawings and they are not warranted to be correct or reliable by the Owner or Barton Malow Company. The Bidder is expected to have conducted its own investigation into the reliability or accuracy of any Resource Drawings, and no adjustment to the Base Bid shall be made if such request arises or results from the Bidder’s failure to conduct such investigation.
- 1.22 “**Subordinate Parties**” means all of **Contractor** employees, workers, laborers, agents, consultants, suppliers or subcontractors, at any tier, who perform, assist with, or otherwise are involved in any of the Work.
- 1.23 A “**Unit Price**” is an amount stated in the Bid Proposal as a price per unit of measurement for materials or services as described in the Bidding Documents or in the proposed Contract Documents.

PART 2 - BIDDERS REPRESENTATIONS

2.01 QUALIFICATION OF BIDDER

- A. The **Owner** reserves the right to request qualification forms or additional information from and Bidder before issuing documents, receiving Bid Proposals or awarding an Agreement. The **Owner** may, at their sole discretion, accept or reject Bidders as qualified. The right to waive any informalities or irregularities in qualification materials is reserved by the **Owner**.

2.02 BIDDER BY MAKING ITS BID REPRESENTS THAT:

- A. Bidder has carefully read, reviewed and understands the Bidding Documents and its Bid Proposal is made in accordance therewith.
- B. Bidder's Bid Proposal is based upon the materials, systems and equipment required by the Bidding Documents without exception.
- C. Bidder certifies that it has examined the Project site, has carefully reviewed the Bidding and Contract Documents, has compared its examination of the Project site with the Bidding and Contract Documents, including the Drawings and Specifications, and is satisfied as to the condition of the Project site, any surface or subsurface obstruction, the actual levels, and all excavating, filling in, removal and demolition, measurements and quantities involved in the Work, and is familiar with weather conditions of the Project area, and has taken account of all of these factors in preparing and presenting its Bid Proposal. Bidder further certifies that it has fully acquainted itself with the character and extent of the Owner's, Barton Malow Company's and other contractor's operations in the area of the Work, and it has taken account of coordination of operations of others in its construction plans set forth in the Bid Proposal. No change orders will be issued to the **Contractor** for or on account of costs or expenses occasioned by its failure to comply with the provisions of this paragraph, or by reason of error or oversight on the part of the **Contractor**, or on account of interferences by the Owner's Barton Malow Company's or other contractor's activities.
- D. The Bidder, by submitting its Bid Proposal, represents that it has carefully reviewed the project schedule, along with the related requirements of Section 00230 - Schedule and Phasing, and acknowledges that these are acceptable and have been taken into account in preparing its Bid Proposal.

PART 3 - BIDDING DOCUMENTS

3.01 COPIES

- A. Bidders may obtain Bidding Documents pursuant to the requirements in the **Advertisement to Bid**.
- B. Bidders shall use complete sets of Bidding Documents in preparing Bid Proposals. Neither the Owner, Barton Malow Company nor the Architect shall be responsible for errors, omissions or misinterpretations resulting from the Bidder's use of partial sets of Bidding Documents.
- C. Copies of the Bidding Documents are being made available on the above terms for the purposes of obtaining Bid Proposals for the Work only. Bidders shall not use the Bidding Documents for any other purpose. Neither the Owner, Barton Malow Company nor the Architect warrants the completeness and/or adequacy of the Bidding Documents.
- D. The Architect will provide, for a fee, electronic data files, and compatible with AutoCAD 2000, for contractors convenience and use in the preparation of shop drawings. Requests for electronic data and fee quote shall be in written form through the architect. Prior to the release of electronic files, the Architect will require a signed waiver of release and payment of the fee. See section **01330-5.03E** for fee.
- E. The Contractors shall be responsible to review Bid Documents before start of construction, and bring any items that could be considered errors or omissions to the attention of the Construction Manager and Architect. Any error or omission items discovered after start of construction shall be the responsibility of the Contractor if determined to be reasonable by the Architect and Construction Manager.

3.02 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- A. Bidder shall promptly notify the Architect through Barton Malow Company of all ambiguities, inconsistencies, or errors that it may discover upon examination of the Bidding Documents or upon examination of the Project site and local conditions. Bidders requesting clarification or interpretation of the Bidding Documents shall make a written request, which shall reach Barton Malow Company by February 21, 2007.

Barton Malow Company
Attn: Andrea Wright, Assistant Project Manager
1301 Boyd
Troy, MI 48083
PH: 248-823-4631
FAX: 248-823-4672

- B. Any interpretation, correction, or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes. Addenda will be mailed, faxed or delivered to all who are known to have received Bidding Documents.
- C. For the dissemination of information, clarification of the intent of the Bidding Documents, and a site visit/tour, a Pre-bid Conference will be held as stated in the **Advertisement to Bid**.

3.03 SUBSTITUTIONS

- A. See Section 01630 Product Substitutions in the Project Manual for substitution submittal requirements. Submit all substitution request forms to Barton Malow Company who will transmit them to the Architect.

3.04 ADDENDA

- A. Addenda will be mailed, faxed or delivered to all who are known by Barton Malow Company to have a complete set of Bidding Documents. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- B. No Addenda will be issued later than **three (3)** days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bid Proposals or one, which includes postponement of the date for receipt of Bid Proposals.
- C. Each Bidder shall ascertain prior to submitting its Bid Proposal that it has received all Addenda issued, and it shall acknowledge its receipt in the proper location on the Bid Proposal.

3.05 ALTERNATES

- A. Each Bidder must bid on all Alternates listed in the Bid Proposal that are applicable to its Bid Category. Alternates will be fully considered in awarding the Agreement.
- B. **Troy School District** shall be allowed a period of **sixty (60)** Days after date of receipt of the Bid Proposals to exercise the right to accept or reject any or all Alternates submitted on the Bid Proposal.
- C. Successful Bidders shall perform all Work required for complete execution of accepted Alternates, and the Bid Proposal shall include all overhead and profit for the Work required.

3.06 VOLUNTARY ALTERNATES

- A. All Bid Proposals must be based upon the Contract Documents. In addition to a Base Bid Proposal, the submission of voluntary Alternates is acceptable and encouraged. If a voluntary Alternate is submitted for consideration, it shall be expressed on the bid form as an add or deduct amount from the Base Bid. If a voluntary Alternate is submitted, the Bidder shall also submit sufficient information in the form of drawings, specifications, test data, delivery dates, scheduling issue considerations, and all other information necessary and sufficient for analysis of the Alternate. The **Owner** reserve the right to unilaterally accept or reject voluntary Alternates and to determine if the voluntary Alternates will be considered in the awarding of the Agreement.

3.07 UNIT PRICES

- A. Each Bidder must bid on all unit prices listed in the Bid Proposal that are applicable to its Bid Category. Unit Prices will be fully considered in awarding the Agreement.
- B. Successful Bidders shall perform all Work required for complete execution of accepted Unit Prices, and such Unit Prices shall include all overhead and profit for the Work required.

3.08 SALES TAX

- A. Unless specifically stated otherwise in Section 00880 of the Project Manual, this Project is subject to state Sales Tax and/or Use Tax and the Bidder’s Bid Proposal shall include all applicable sales and use tax.

3.09 NO DISCRIMINATION

- A. All Bidders shall ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, national origin, age, marital status, sexual orientation, or disability and in conformance with local, state and federal laws, regulations and ordinances.
- B. In regard to any Agreement entered into pursuant to this Bid Package, minority and women owned business enterprises will be afforded full opportunity to submit Bid Proposals in response to the **Advertisement to Bid** and will not be discriminated against on the grounds of race, color, religion, sex, national origin, age, marital status, sexual orientation, disability or any other status protected by applicable law.

3.10 PHASES OF CONSTRUCTION

- A. The Bidder, if awarded the Agreement, agrees to proceed under the method known as phased construction whereby construction commences prior to completion of all working drawings for subsequent Work.
- B. The Project has been and may be bid in the following phases:

<u>BID PACKAGES</u>	<u>ESTIMATED DUE DATE</u>
Phase II – Troy High School Additions & Renovations	March 6, 2007

- C. Bidder shall acquaint itself with the nature and content of the other Bid Packages of this Project. Bidder shall be familiar with the current phase(s) of construction and the extent of how this and the other Bid Packages affect its Work.

3.11 OTHER BID CONSIDERATIONS

- A. **PREVAILING WAGES** – The successful Bidder and its Subordinate Parties shall comply with the Prevailing Wage requirements described in Section 00870 Labor Relations in the Project Manual.

PART 4 - BIDDING PROCEDURE

4.01 FORM AND STYLE OF BIDS

- A. Bid Proposals shall be submitted in triplicate on the Bid Proposal Form included in Section 00400 with the Bidding Documents.
- B. All blanks on the Bid Proposal Form shall be filled in by typewriter or manually in ink.
- C. Where so indicated by the makeup of the Bid Proposal Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.
- D. All interlinear marks, alterations or erasures shall be initialed by the signer of the Bid Proposal.
- E. All requested Alternates and/or Unit Prices shall be bid. A dollar amount of each Alternate and/or Unit Price in both words and numerals, even if the amount is \$0.00, shall be included. Terminology such as "No Bid", "Not Applicable", "No Change" or "Does Not Apply" shall not be used. If the Alternate and/or Unit Price do not apply to the Bidder, an amount of \$0.00 shall be included.
- F. Each copy of the Bid Proposal shall include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, a partnership, a corporation, or some other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract of the size and scope of the Agreement. A Bid Proposal by a corporation or LLC shall further indicate the state of incorporation or registration. A Bid Proposal submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.
- G. The Work of an individual Bid Category described in these documents is the sole responsibility of the successful Bidder for that Bid Category. Bids will only be accepted on the full scope of Work outlined by this Bid Package/Bid Category. The Work of each Bid Category is described in Section 00220 Work Scopes.
- H. Each Bid Proposal received shall be in strict conformity with the requirements of the Bidding Documents, including, but not limited to, the Description of the Work/Special Provisions, Work Scopes and Scheduling information.

4.02 BID SECURITY

- A. Bid security in the form of a bid bond issued by a qualified surety, certified check or cashier's check in the amount of five percent (5%) of the Base Bid amount will be required at the time of submission of the Bid Proposal. Bid bonds shall be duly executed by the Bidder, as principal and by a surety that is properly licensed and authorized to do business in the state in which the Work is to be performed. All sureties providing bonds for this Project must be listed in the latest version of the Department of Treasury's Circular 570, entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies", with the bond amount less than or equal to the underwriting limitation, and/or have an A.M. best rating of A- or better.
- B. Bid bond shall pledge that the Bidder, with the understanding that if its Bid Proposal is accepted, will enter into the Agreement with **Troy School District** for any of the Bid Category (ies) accepted from its Bid Proposal and will, if required, furnish performance and payment bonds covering the faithful performance of the Agreement and the payment of all obligations arising there under. The attorney-in-fact, who signs the surety bond, must submit along with the bond, a certified and effectively dated copy of his/her power of attorney.

- C. Bid bond form AIA Document A310 is approved for use on this Project.
- D. The bid security obligees shall be **Troy School District** and the amount of the bid security shall become **their** property in the event that the Bidder fails, within **Sixty (60)** days of notice of award or receipt of the Agreement form, to execute the Agreement, and deliver the performance and payment bonds as described in the Project Manual, section 00610. In such case, the bid security shall be forfeited to **Troy School District** as liquidated damages, not as a penalty
- E. The Owner will have the right to retain the bid security(ies) of Bidders to whom an award is being considered until either (a) the Agreement has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bid Proposals may be withdrawn, or (c) all Bid Proposals have been rejected.
- F. Bid security will be returned to the successful Bidders after the Agreement has been executed, and acceptance of required performance and payment bonds. The bid security of Bidders that are not under consideration for award of the Agreement will be returned to those Bidders.

4.03 SUBMISSION OF BIDS

- A. All copies of the Bid Proposal, the bid security and any other documents required to be submitted with the Bid Proposal shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, if applicable, the designated portion of the Work for which the Bid Proposal is submitted. If the Bid Proposal is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face of the envelope.
- B. Bid Proposals shall be deposited at the designated location prior to the time and date for receipt of Bid Proposals indicated in the **Advertisement to Bid**, or any extension thereof made by Addendum. Bid Proposals received after the date and time for receipt of bids will be returned unopened.
- C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bid Proposals.
- D. Oral, telephonic, facsimile, e-mailed or telegraphic Bid Proposals or bid securities are invalid and will not receive consideration.
- E. Bid Proposals will only be accepted for individual Bid Categories. Bidders are required to bid an entire Bid Category. Bidders may bid more than one Bid Category. Combined bids covering several Bid Categories may not be accepted unless separate bid amounts are listed for each Bid Category making up the combined bid amount. The amount for a combined bid, however, need not be equal in amount to the total of the individual category bids.

4.04 MODIFICATION OR WITHDRAWAL OF BID PROPOSAL

- A. A Bid Proposal may not be modified, withdrawn or canceled by the Bidder after the stipulated time period and date designated for the receipt of Bid Proposals, and each Bidder so agrees in submitting its Bid.
- B. Prior to the time and date designated for receipt of Bid Proposals, any Bid Proposal submitted may be modified or withdrawn by notice to the party receiving Bid Proposals at the place designated for their receipt. Such notice shall be in writing over the signature of the Bidder.
- C. Withdrawn Bid Proposals may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

- D. Bid security under B. or C., above shall be in an amount for the Base Bid as modified or resubmitted.

PART 5 - CONSIDERATION OF BIDS

5.01 OPENING OF BIDS

- A. Bid Proposals received on time will be open **publicly**.
- B. Bid Proposals shall be held open and irrevocable for **Forty-five (45)** Days after the date for receipt of bids.

5.02 REJECTION OF BIDS

- A. **Troy School District** shall have the right to reject any or all Bid Proposals and to reject a Bid Proposal not accompanied by the required bid security or by other information required by the Bidding Documents, or to reject a Bid Proposal which is in any way incomplete or irregular.
- B. Bids Proposals are considered irregular and may be rejected for any of the following reasons unless otherwise provided by law:
 - 1. If Bid Proposal Form furnished is not used or is altered.
 - 2. If there are unauthorized additions, qualified or conditional Bid Proposals, or irregularities of any kind which may make the Bid Proposal incomplete, indefinite, or ambiguous as to its meaning.
 - 3. If Bidder adds any provisions reserving right to accept or reject any award, or enter into the Agreement pursuant to an award.
 - 4. If Unit or Lump Sum prices or Alternates contained in the Bid Proposal are obviously unbalanced either in excess of, or below, reasonable cost analysis values.
 - 5. If Bidder fails to complete the Bid Proposal Form where information is requested so the Bid Proposal form cannot be properly evaluated.
 - 6. Bidder is deemed to not be the Lowest Responsive, Responsible Bidder by definition and prevailing statutes.
 - 7. Bidder does not submit with its Bid Proposal a sworn an notarized statement of Familial Disclosure.

5.03 ACCEPTANCE OF BID (AWARD)

- A. It is the intent of the **Troy School District** to award the Agreement to the Lowest Responsive and Responsible Bidder provided the Bid Proposal has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. **Troy School District** shall have the right to waive any informality or irregularity in any Bid Proposal received and to accept Bid Proposals which, in its judgment, are in its own best interest which includes not awarding to the low bidder. **Troy School District** reserves the right to reject any Bid Proposal in **its** sole discretion except where otherwise provided by law.
- B. **Troy School District** shall have the right to accept Alternates in any order or combination and to determine the low Bidder on the basis of the sum of the Base Bid, Voluntary Alternates, and Alternates accepted.
- C. **Troy School District** shall have the right to accept combination bids from a Bidder for more than one Bid Category.

- 5.04 To the extent that these Instructions to Bidders and applicable public bidding laws, rules, regulations or ordinances conflict with each other, the provisions of the applicable bidding laws, rules, regulations or ordinances shall govern.

PART 6 - POST BID INFORMATION

6.01 POST BID INFORMATION

- A. After the Bids are received, tabulated, and evaluated, the apparent low Bidders **when so requested by the owner and/or Barton Malow Company shall** meet with the Barton Malow Company at a post-bid meeting for the purposes of determining completeness of scope and any contract overlaps or omissions. If requested, the Bidder shall submit additional qualification forms or other information as required in the Instructions to Bidders. The Bidder will provide the following information at the post-bid meeting:
1. Designation of the Work to be performed by the Bidder with its own forces including manpower for the **Contractor** and that of its Subordinate Parties.
 2. Detailed cost breakdown of the Bidder's Bid Proposal including labor, equipment and material unit prices.
 3. A list of names of the Subordinate Parties proposed for the principal portions of the Work.
 4. The proprietary names and suppliers of principal items or systems of materials and equipment proposed for the Work.
 5. The names and backgrounds of the Bidder's key staff members including superintendent and assistants. Bidder shall be requested to establish the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.
 6. Commitment to construction schedules, identification of items requiring long lead deliveries and manpower information in accordance with Section 00230 of the Project Manual.
- B. Prior to award of the Agreement, Barton Malow Company will notify the Bidder if either the Owner, the Architect, or Barton Malow Company, after due investigation, has reasonable objection to any proposed Subordinate Party. If the Owner, Architect or Barton Malow Company has reasonable objection to any proposed Subordinate Party, the Bidder may, at its option: (1) withdraw its Bid Proposal; or (2) submit an acceptable substitute Subordinate Party with an adjustment in its bid amount to cover the difference in cost occasioned by such substitution. The **Troy School District** may, at its discretion, accept the adjusted bid amount or it may disqualify the Bidder. In the event of either withdrawal or disqualification under this Subparagraph, bid security will not be forfeited, notwithstanding the provision of Part 4, paragraph 4.04., A in the Instructions to Bidders.
- C. Upon the Award of the Agreement, the **Contractor** shall submit to Barton Malow Company a complete list of all items, products, and layouts for which shop drawings, brochures, or samples are required; name of each Subordinate Party; and date of planned submission. Refer to Section 01330 Submittals of the Project Manual for additional information.
- D. The Bidder will be required to establish to the satisfaction of the Barton Malow Company, Owner and Architect, the reliability and responsibility of the Subordinate Parties proposed to furnish and perform the Work described in the Bidding Documents.
- E. Prior to execution of the Agreement, the Bidder shall furnish separate Performance and Payment Bonds, if required, covering the faithful performance of the **Contractor** and the payment of all obligations

arising there under equal to 100 per cent of the total amount payable by the terms of the Agreement. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work submit evidence satisfactory to the Owner and Barton Malow Company that such bonds will be furnished. Refer to Section 00610 of the Project Manual for further information.

- F. Before commencement of any Work, a Certificate of Insurance executed by Bidder's insurance agent or carrier showing evidence of required insurance coverages shall be submitted in accordance with the Insurance Requirements set forth in Section 00620 of the Project Manual.
- G. The Agreement Form to be used for this project is described in Section 00500 of the Project Manual.

END OF SECTION 00200

SECTION 00210
DESCRIPTION OF THE WORK/SPECIAL PROVISIONS

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. All Bidders are responsible to review all other Bid Category Work descriptions and immediately advise the Barton Malow Company of any adverse factors, conflicts or ambiguities that might affect the execution of Work of this Bid Package. Each Bidder is responsible to review all Bid Category descriptions and Contract Documents and coordinate the Work accordingly. Each Bidder shall incorporate into its Bid Proposal the cost of coordination of the Work with the requirements of all related Contract Documents, as shown, specified, or required.
- C. Each Bidder shall thoroughly examine all of the Bidding Documents for the Work of all trades so as to familiarize itself both with the Work required under its Bid Category (ies) and with Work required under all other Bid Categories.
- D. The Bidding Documents shall be construed so as to require the Bidder to perform all Work reasonably inferable therefrom as being necessary to produce the intended results. Bidders are required to visit and examine the Project site and may arrange the visit through Barton Malow Company.

1.02 PROJECT DESCRIPTION

- A. **The Project is Troy School District, Athens High School Concessions' Remodeling, bid pack #9393. The renovation work consists of one new exterior footing, exterior / interior concrete demo and new concrete, exterior / interior demo and construction of masonry walls, new exterior / interior doors (including several coiling doors), new plaster ceilings, new casework, demo and addition of plumbing lines and fixtures, demo and addition of HVAC duct work, demo and addition of new electrical power and lighting throughout exterior / interior .**
- B. **The Renovations to Troy Athens High School Concessions Stand are scheduled to start June 20th, 2007 and turn over to Troy School District by August 2nd, 2007. The contractor will be responsible to complete all work by the completion dates listed above. See project manual section 00230 – Schedule and Phasing for further clarification.**
- C. **A Pre-Bid Conference for this project will be held on Wednesday, February 21st, 2007 at 3:00PM at the Athens High School Concessions Building (located at 4333 John R., Troy, MI 48098).**

1.03 SUMMARY OF THE BID CATEGORIES/WORK SCOPES

- A. The following is a listing of Bid Categories for **Bid Package No.9393, Athens High School Concessions' Remodeling** for Troy School District. All work relative to the Bid Package is identified on plans and specifications as prepared by the Architect. Each Bid Category description identifies the Scope of Work to be performed by the Bidder as designated by Barton Malow Company.

BID CATEGORY CODE**TITLE**

6.2	General Trades
15.1	Mechanical
16.1	Electrical

- B. Specific Bid Category/Work Scope descriptions are found in Section 00220.

1.04 SPECIAL PROVISIONS

- A. The following special provisions form a part of each Bid Category Work Scope and apply to each Contractor's Scope of Work found in Section 00220.
- B. The Bid Category/Work Scopes should in no way be construed as being all inclusive. The Work Scope is issued as a guide to aid in the assignment of Work. If conflict regarding assignment of Work exists between the drawing notes and these descriptions, the Description of the Work and Bid Category/Work Scopes will take precedence. Notwithstanding the foregoing, the **Contractor** shall carefully review and compare the Drawings and Specifications with the Work Scopes, and if a conflict exists, the **Contractor** shall immediately notify Barton Malow Company in writing. The Bid Category numbers and the specification section numbers are not, in all cases, identical.
- C. Each Bidder is to carefully examine the schedule enclosed in the Bidding Documents. Each Bidder shall be prepared to review at the post-bid meetings a schedule for the engineering, fabrication, delivery and installation of its Work. This information will be considered in the award recommendation.
- D. All **Contractors** are to coordinate all Work with the work of other trades for proper function and sequence (see Section 01360). **Contractor** must furnish approved copies of shop drawings, mock-ups, and technical data to other contractors designated by the Barton Malow Company for the purposes of coordination of this Work. **Contractor** must provide to all other trades all information (drawings, diagrams, templates, embedments) and other related Work necessary for the proper coordination of the Work of all trades. Each phase of the Work shall be coordinated, and the coordination plan approved by Barton Malow Company prior to proceeding. **Contractor** shall keep informed as to Work of all trades engaged in the Project, and shall execute Work in such a manner as not to delay or interfere with the progress of other trades involved. **Contractor** is required to schedule its Work so that no other party is delayed in execution of its work. **Contractor** is required to employ competent supervision on the Project throughout the entire period of construction to ensure proper coordination.
- E. **Contractor** will furnish before any Work is started, evidence of ISO Certification or documented procedures for process control, including drawings, submittals, inspection/surveillance and training. In lieu of defined procedures, **Contractor** will follow Barton Malow Company's documented procedures for process control.
- F. When it is necessary to modify or tie into existing utility services, **Contractor** shall notify Barton Malow Company in writing a minimum of 48 hours prior to the planned disruption. All disruptions shall be scheduled with Barton Malow Company and shall be kept to a minimum time. Tie-ins and shutdowns of existing utilities may have to be performed during off hours. **Contractors** are to include any required premium time in the Base Bid.
- G. If Owner will occupy the premises or a portion of the premises during the construction, **Contractor** shall cooperate with Barton Malow Company and Owner in all construction operations to minimize conflict, and to facilitate Owner occupancy.
- H. Information pertaining to the existing building has been obtained through photographs and investigations and is indicated on the Resource Drawings. This information is not warranted to be complete or accurate. **Contractor** shall verify all dimensions in the field prior to ordering materials or construction and any costs or expenses arising out of its failure to do so shall be borne solely by **Contractor**.

- I. The **Contractor** shall examine the existing site conditions and carefully compare them to the Drawings. All measurements must be verified from actual observation at the Project site. The **Contractor** is responsible for all Work fitting in place in approved, satisfactory and workmanlike manner in every particular. If the **Contractor** encounters unexpected existing site or building conditions, it shall cease operations immediately to minimize damage and shall immediately notify Barton Malow Company in writing. **Contractor** shall bear all costs, expenses or damages arising or resulting from its failure to comply with this paragraph.
- J. Hoisting of material or equipment above occupied areas will NOT be permitted unless the existing structure has been properly verified by a licensed professional Engineer to be able to bear the load of the material or equipment being hoisted if accidentally released. It is the responsibility of the **Contractor** performing such hoisting to properly and adequately reinforce existing structures.
- K. Space for electrical and mechanical lines is limited for the Project. Therefore, it is imperative that **Contractor** coordinate its Work with the Work of all other trades to ensure containment of electrical and mechanical lines in space provided. Priority of space will be decided in discretion of Barton Malow Company, with no additional compensation, where unresolved conflict exists. If Work is not properly coordinated, **Contractor** shall remove and relocate Work without additional compensation.

1.05 REQUIREMENTS

- A. All start-up administrative documents shall be submitted within (10) working days of award. Also, submit material and shop drawing register and delivery schedules for pre-approval.
- B. Coordinate purchase, color selection, approvals, delivery and installation of new work to maintain project schedule. Include all pre-purchase and storage costs associated with securing materials. Include cost of at least one (1) months storage in advance of installation.
- C. Coordination with other trades, including mandatory participation in job meetings.
- D. Verify all dimensions and conditions of openings for compliance with the design intent prior to submittal of related shop drawings for fabrication of materials. For long lead items, in lieu of completed openings of as-built measurements, secure and sign-off on "Hold-Dimensions" through Barton Malow with the appropriate trade contractor(s).
- E. It is the responsibility of this Bid Category to review ALL drawing notes including civil, code plans, architectural, structural, food service, mechanical and electrical drawings as well as the specifications for areas requiring work described by this Bid Category and include same in bid.
- F. This contractor shall be responsible for receiving, off loading, hoisting into/onto building including the safe and secure storage of materials related to this work.
- G. Furnish and install temporary partitions for dust control measures as required for work of this category. Use wet cutting methods and dust collection, engineered controls in order to eliminate silica exposure. Comply with all MIOSHA requirements. Use only electric and pneumatic equipment. Contractor shall not exceed permissible levels of exhaust from power equipment as established by MIOSHA requirements. (Gas operated equipment shall be prohibited within the building after enclosure).
- H. Provide daily clean up, according to Barton Malow Company standards, including daily removal of all materials and identifiable debris related to this category. If daily clean up is not performed, the Construction Manager will provide labor to complete the clean up and the appropriate contractor will be back-charged.
- I. Contractors shall be responsible for safe disposal of any Hazardous Materials as a result of their own work.

- J. Provide joint sealers where shown and as required by work of this category. Contractor is responsible for all joint prep, backers, primers, caulking and sealants where installed material is adjoining a dissimilar material.
- K. Provide all cold weather protection as described in section 01520 Temporary Construction Facilities and Controls section of the Project Manual.
- L. All penetrations through walls, floors, and ceilings shall be fire and smoke stopped using materials and rated assemblies as required to comply with the State Fire Marshall Requirements as identified on the code plan for building separations.
- M. Protection of new construction shall be part of this bid. Cover and protect adjacent items when installing work of this category in order to prevent any damage. If any adjacent surfaces are damaged it will be the sole responsibility of the contractor at fault to completely repair and replace all damaged construction to the satisfaction of the Owner, Construction Manager, and Architect.
- N. Remove packaging labels and final clean all surfaces of items installed by this category. Verify acceptance and secure sign-off with Construction Manager prior to leaving the site.
- O. This contractor shall furnish, upon completion of work, as-built reproducible drawings showing the installation of the work as completed and three sets of operating and maintenance manuals as described in the specifications.
- P. Deliver maintenance stock to Owner's Maintenance Facility, as required. Check with Barton Malow Company prior to delivery. Provide a signed transmittal of these items by Owner for a close out file.
- Q. Reference section 01330-2.01-F of the project manual for additional fees which may be incurred regarding submittals.
- R. Any and all time tickets are to be signed by Barton Malow and submitted on a daily basis. No time tickets will be accepted unendorsed. Allowance, when billed, shall be exclusive of mark-ups and fees. Any money not used at the end of the project will be deducted from the contract.

END OF SECTION 00210

WORK SCOPE ASSIGNMENT

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DEMOLITION & RENOVATION NOTES:

- ① REMOVE WALLS, DOORS AND FRAMES AS DESIGNATED DASHED LINES, TYP. SALVAGE ALL BRICK TO BE REMOVED, CLEAN AND USE TO PATCH INFILL AREAS.
- ② REMOVE CONC. SLAB AND GRADE BEAM. SEE STRUC. PLANS FOR NEW FOUNDATION/ FOOTINGS REQ'D.
- ③ REMOVE COILING DOOR & TRACK
- ④ REMOVE 8" MASONRY LOW WALL BEHIND CASEWORK - SEE I/A3.1.
- ⑤ REMOVE RUBBER BASE, GLUE & OTHER INSTALLATION MATERIALS. PREPARE WALL TO RECEIVE NEW FINISHES.
- ⑥ REMOVE CHAIN LINK FENCING & GATE.
- ⑦ REMOVE COUNTERTOP, SHELVING & CASEWORK. PATCH FLOOR & WALLS AS REQ'D.
- ⑧ REMOVE SIGNAGE & RETURN TO OWNER.
- ⑨ REMOVE VCT FLOORING, RUBBER BASE, GLUE & OTHER INSTALLATION MATERIALS. PREPARE FLOOR & WALLS TO RECEIVE NEW FINISHES.
- ⑩ REMOVE WOOD SHELVING, BRACKETS & STANDARDS & RETURN TO OWNER. PATCH WALLS AS REQ'D.
- ⑪ REMOVE PLASTER CEILING & STRUCTURAL SUPPORT. PATCH WALLS AS REQ'D.
- ⑫ REMOVE PLASTER CEILING & STRUCTURAL SUPPORT AT EXTERIOR SOFFITS. PATCH WALLS AS REQ'D.
- ⑬ REMOVE EXIST. FIRE EXTINGUISHER & CABINET & RELOCATE AS SHOWN ON FLOOR PLAN.
- ⑭ OWNER SHALL REMOVE EXIST. RETRACTABLE AWNING & RELOCATE AS SHOWN ON FLOOR PLAN. CONTRACTOR SHALL PATCH EXIST. MASONRY AS REQ'D.
- ⑮ REMOVE EXIST. STONE SILL. PATCH WALL AS REQ'D.
- ⑯ SAWCUT EXIST. PAVING & REMOVE FOR FOOTING/FOUNDATION WORK. VERIFY EXTENT OF DEMO. W/ CONCRETE CONTRACTOR U.N.O.
- ⑰ SAWCUT CONCRETE FLOOR AS SHOWN & REMOVE FOR UNDERGROUND PLUMBING WORK & FUTURE COOLER INSTALLATION (BY OWNER). VERIFY EXTENT OF FLOOR REMOVAL W/ STRUCTURAL & PLUMBING PLANS.
- ⑱ OWNER SHALL REMOVE ALL LOOSE KITCHEN EQUIPMENT & STORE UNTIL REMODELING IS COMPLETE U.N.O. OWNER WILL THEN INSTALL LOOSE EQUIPMENT & COMPLETE UTILITY HOOK-UP U.N.O.
- ⑲ REMOVE MASONRY AS REQ'D. TO INSTALL FIRE DAMPERS IN EXIST. DUCTWORK.
- ⑳ REMOVE EXIST. STEEL LINTEL ABOVE EXIST. COILING COUNTER DOOR & SHORING EXIST. MASONRY TO REMAIN. SEE STRUC. & ARCH. DETAILS. ALL OTHER LINTELS TO REMAIN U.N.O.

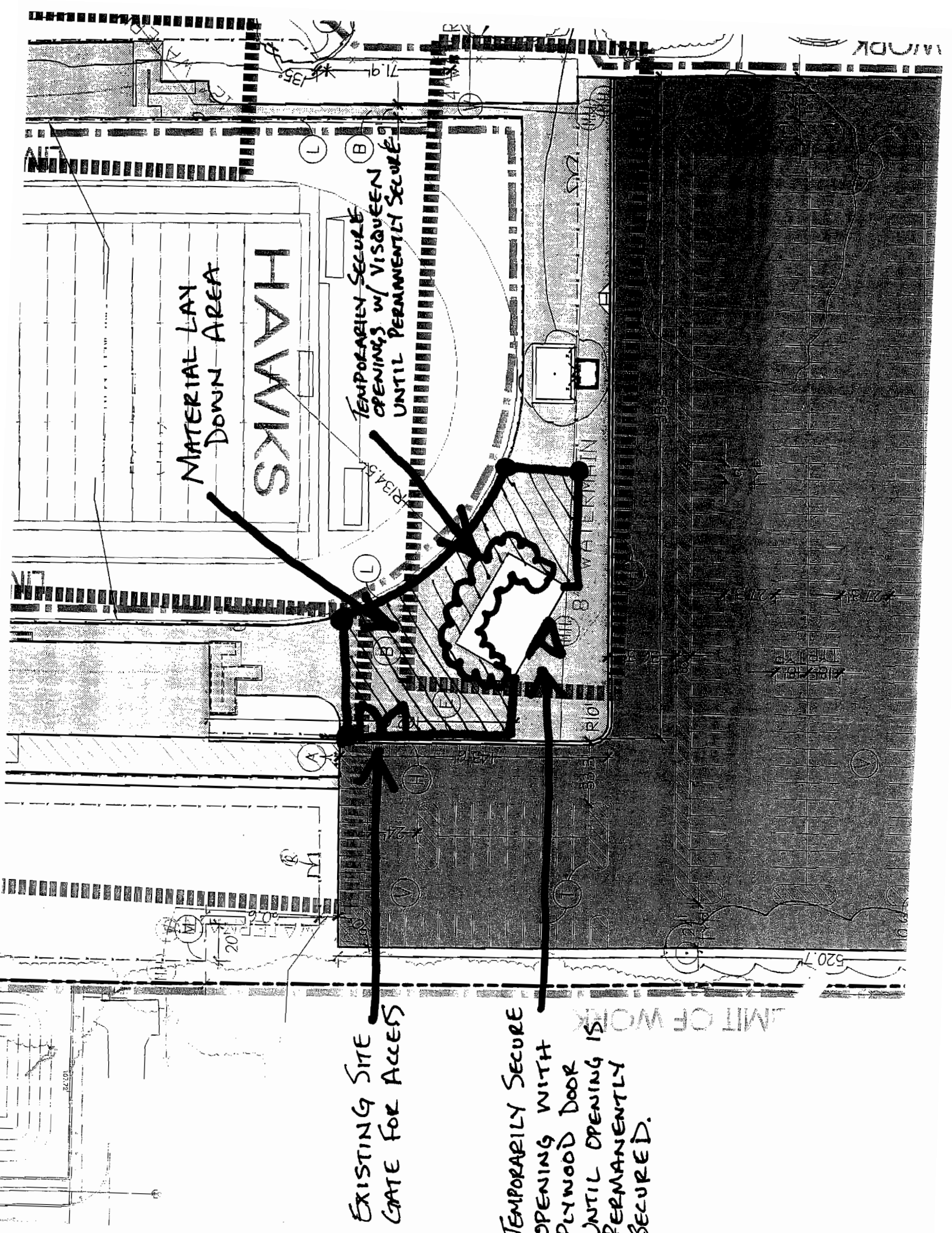
MATERIAL LAY
DOWN AREA

HAWKS

TEMPORARILY SECURE
OPENINGS w/ VISQUEEN
UNTIL PERMANENTLY SECURED

EXISTING SITE
GATE FOR ACCESS

TEMPORARILY SECURE
OPENING WITH
PLYWOOD DOOR
UNTIL OPENING IS
PERMANENTLY
SECURED.



**SECTION 00220
WORK SCOPE**

BID CATEGORY – General Trades 6.2

The Work of this Bid Category includes but is not limited to providing all labor, equipment, materials, scaffolding, hoisting and incidentals to complete all **concrete, masonry, steel, carpentry, doors and hardware, drywall, ceilings and miscellaneous as noted** in accordance with the Contract Documents and applicable codes. All Work is to be performed as shown on the plans and specified in the following technical Specification sections:

<u>Section</u>	<u>Name</u>
01230	Alternates
01731	Cutting and Patching
01732	Selective Demolition
03300	Cast-In-Place Concrete
04810	Unit Masonry Assemblies
05120	Structural Steel
05500	Metal Fabrications
06105	Miscellaneous Carpentry
07841	Through-Penetration Firestop Systems
07920	Joint Sealants
08110	Steel Frames
08311	Access Doors and Frames
08331	Overhead Coiling Doors
08710	Door Hardware
09111	Non-Load Bearing Steel Framing
09215	Gypsum Veneer Plastering
09911	Exterior Painting
09912	Interior Painting
12355	Institutional Casework

In addition to the above, this Bid Category requires adherence to but not limited to the Bidding Documents, the Bidding and Contract requirements and Division 1 General Requirements of the Project Manual and coordination with various other technical Specifications interfacing with this Work. The Bidder is advised to review the Work descriptions of the other Bid Categories as set forth in Section 00210 of the Project Manual so as to not misunderstand scope responsibilities.

THE SCOPE OF WORK IS TO INCLUDE, but is not limited to, the following items:

1. There is no demolition contractor in this bid package. This contractor is responsible for demolition in his/her sections as well as the demolition as it is noted on the Architectural Demolition Notes, which can be found behind Project Manual section 00210 – Description of the Work/Special Provisions. These work scope assignments are to be included in your base bid.
2. Include the costs for any overtime necessary to meet substantial completion of July 19, 2007. Please review project manual section 00230 – Schedule and Phasing for further clarification.
3. Furnish and install items listed in specification sections above.

4. Perform all layout necessary to complete this contractor's work. It is this contractor's responsibility to identify and locate site utilities prior to excavation of footings.
5. This contractor is responsible to maintain and keep all site utilities/systems in working order that are within the work limits. Site utilities should be identified and marked by this contractor to proactively prevent interruptions in service. Employ the service of an independent contractor (such as **Power Plus – 248-344-0200**) to identify and mark underground services. Provide as-built drawings to BMC for distribution to other trades. It is this contractor's responsibility to review survey drawings and Barton Malow record drawings prior to excavation. It is also this contractor's responsibility to walk site with the Barton Malow superintendent before start of work.
6. Excavate for and place concrete including but not limited to floor slabs, foundations, footings, entry stoops, stairs and equipment pads as shown on drawings. Replace backfill at excavations and remove spoils off site.
7. Patch floors where existing walls are shown to be removed.
8. Install exterior perimeter insulation at foundations.
9. Furnish and install all reinforcement steel as detailed in this contractor's work.
10. Sub-grade will be established inside the building footprint + or - 4". Re grade below slabs, and re-establish sub-grade elevation. Furnish and install compacted granular base material.
11. Provide 48-hour notice to the Construction Manager prior to the placement of backfill or concrete so the testing laboratory can be scheduled to test these materials. This contractor will be responsible for the cost of emergency testing services if the 48-hour notice is not given. The contractor's on-site foreman shall be present during testing and field reviews conducted by various inspection agencies.
12. Only wet cutting will be permitted on silica containing materials.
13. Coordinate with the site Superintendent regarding removal of spoils at time of excavation.
14. Re-grade areas disturbed by work activities of this category within the building footprint immediately before pouring slab.
15. Dumpsters indicated to be provided by the Owner in the General Requirements and Supplementary Conditions WILL NOT be provided for concrete and/or masonry debris.
16. Tooth in any areas necessary pertaining to the tie in of the addition(s) to the existing building or for new and/or larger openings necessary in the existing building.
17. Patch existing masonry surfaces to match existing where affected by demolition and / or shown on demolition drawings.
18. Provide CMU infill where existing windows, doors, louvers, etc. have been removed. Tooth in brick to match existing.
19. Unload, store, protect, and install metal fabrications is the responsibility of this contractor.
20. Furnish and install all building damproofing shown on masonry walls.

21. Furnish and install building insulation including all spray foam insulation, on masonry walls.
22. Install all miscellaneous structural steel beams and lintels, plates, steel reinforcement miscellaneous steel supports and bond beams required to support masonry. Include all welding, bolting, anchorages etc.
23. 8' planking on all scaffolding shall be cleated and decking must have toe kicks per MIOSHA/OSHA/ANSI standards.
24. This contractor is responsible for all firestopping assemblies on existing and new CMU walls where new work is being performed called out on plans, per UL listing standards in the specifications. See code compliance sheets and Partition Type Details in the drawings for further clarification. Include fire rating at head of wall at existing remodel spaces.
25. This contractor is responsible to protect electrical back boxes after installation.
26. Furnish and install all rebar (including horizontal, vertical, and positioning accessories) necessary for CMU walls.
27. Install hollow metal door and window frames and associated anchors in all masonry walls.
28. Install sleeves furnished by other trades.
29. Furnish and install bond breaker strips.
30. Furnish and install sealant within exterior and interior masonry wall construction and when masonry abuts an existing dissimilar surface.
31. Perform brick washing in accordance with specifications and protect adjacent materials to prevent damage to finishes from the cleaning process. Clean block-walls to provide a smooth surface suitable for paint. Condition of interior block must be left in a condition suitable for painting.
32. 15.1 - Mechanical will provide layout drawings for through wall penetrations of mechanical systems to 6.2 – General Trades at least two weeks prior to block installation in that unit. Any layout drawings not provided in this time frame may result in a back charge to the Mechanical contractor.
33. Cutting of walls for installation of electrical / technology boxes provided by others are this contractor's responsibility within masonry walls. The masonry, electrical and carpentry contractors will share the responsibility and any cost incurred for adjustment to ensure a square/plumb quality finished product.
34. Furnish and install all joint systems within masonry walls and where masonry walls meet existing surfaces.
35. This contractor is responsible to have all lintels, plates and anchor bolts for masonry completion on site at beginning of foundation walls.
36. This contractor is responsible for all lintel sizes and coordination with all necessary contractors. Inform BMC of coordination issues and efforts.

37. It is this contractors' responsibility to unload all joists, decking and miscellaneous steel required for job completion.
38. All stored materials must be kept on dunnage and off the ground.
39. Clean and prepare all walls, hollow metal doors and frames, and surfaces for finishing, including all required caulking, patching, sanding and minor repairs. Joint sealer is to be used at all interior finishes or all dissimilar metals and/or surfaces. If walls need more than minor prep notify job superintendent.
40. This contractor is responsible for removing or covering all cover plates, trim pieces and other pre-finished surfaces necessary for the performance of this work and replacing same at the conclusion of this Contractor's work. Cover and protect new work to avoid damage.
41. Provide finish painting for walls, ceilings, soffits and underside of deck where ceiling is exposed.
42. Provide finish painting of all hollow metal doors and frames as shown on drawings. Install joint sealant at perimeter of frames prior to painting.
43. Provide minor prep and paint existing wall surfaces where existing casework, shelving, toilet partitions and accessories are to be removed.
44. Furnish and install all rough carpentry, finish carpentry, wood treatments, wood blocking, sleepers, nailers, curbs, framing, and plywood indicated on the drawings. Include all window blocking and roof blocking. Include casework/equipment blocking. Coordinate with appropriate supplier/installer.
45. Furnish and receive all wood, hollow metal and steel doors, frames and door hardware. Store doors and frames prior to installation including insulated panels and louvers in doors. Doors and frames are to be free of rust and debris upon installation. Contractor will be responsible for removing any rust that may appear on the steel doors and frames. Perform all trouble-shooting and correction of hardware problems after owner occupancy for the duration of the 2-year warranty period. Shake out and place material in respective unit upon delivery.
46. This contractor is responsible for the removal and replacement of all wood, hollow metal and steel doors, frames and hardware that are to be replaced. Existing doors are not be removed until receiving delivery of replacement door. Include removal and disposal of the existing door and frame.
47. Furnish and install all access panels in gypsum walls and/or ceilings as shown on plans. Install access panels provided by mechanical and electrical trades.
48. This contractor is responsible to increase wall support of all frames (door and window) if existing framing is not adequate.
49. Lock cylinders for demolished doors that are to be replaced are to be salvaged, labeled, and turned over to the Owner.
50. Specification section 08710-1.4-D shall be superseded by the following: Keyway for all cylinders shall be provided per the Owner's schedule. Keying shall be by contractor for all doors, per the direction of the Owner. Contractor is to use a local licensed, bonded and insured locksmith.

Note: The School district states to use the first 5 pins, drop the 6th and 7th. TSD will provide master and grand master key through Barton Malow. All interior doors are to be keyed with their respective key, as well as the grand master and master key. All exterior doors are to be keyed with the grand master and master. Each pass key is to be labeled and turned over to the district through Barton Malow along with the original master and grandmaster keys.

51. Furnish and install all casework required for a complete installation. All final adjustments will be the responsibility of this contractor.
52. This contractor is responsible for the covering of casework and countertops for protection against damage. Protection shall be secured cardboard, masonite or appropriate material for owner turnover.
53. Provide and coordinate the installation of all mechanical and electrical fixtures and devices, associated with casework, with the appropriate trades. Provide detailed rough-in drawings within twenty (20) calendar days of contract award.
54. Layout of piping to be reviewed by the casework contractor to avoid unnecessary cutting of casework. Piping layout on drawings is diagrammatic only.
55. The electrical and carpentry contractor will share the responsibility for a square/plumb installation of all electrical and technology boxes in gypsum wall assemblies. Any cost incurred to adjust boxes to ensure a quality finished product will be shared by these contractors
56. Furnish and maintain all necessary barricades, safety and warning devices to complete this work.
57. Furnish and install gypsum/plaster ceiling and soffit assemblies complete.
58. Furnish and install building insulation as it relates to this contractors work.
59. Protect existing surfaces in rooms and exterior areas within limits of construction, while performing this contractor's work. Provide protection of this contractors installed work until Owner turnover. If any adjacent surfaces are damaged it will be the sole responsibility of the contractor at fault to completely repair and replace all damaged construction to the satisfaction of the owner, construction manager and architect.
60. Refer to code compliance sheets and Partition Type Details. This contractor is responsible for all firestopping assemblies at new and existing drywall assembled walls where new work is being performed. Ratings of assemblies shall meet UL #U905 standards. Include fire rating at all head of walls for existing remodel spaces & penetrations.
61. Furnish and install all joint systems where this work abuts existing surfaces as shown. Caulk all products installed by this contractor.
62. Furnish and install one hour temporary walls with frame and door with handle and hasp between existing building and new construction as directed by OFS and/or BMC. Temporary wall must be weatherproof if exposed to exterior elements. Patch and repair existing surfaces as needed upon temporary wall removal. Refer to composite plans, found behind project manual section 00210 – Description of the Work/Special Provisions, for proposed temporary protection measures for both weather and security. These work scope assignments are to be included in your base bid.

63. This project will enforce the use of 100% fall protection for all exposures 6 feet or greater for all workers.
64. Final cleaning must be included as part of this base bid.
65. Include a \$2,500 allowance for miscellaneous items. Allowance to be used on a time and material basis as directed by BMC. Unused portions will be deducted from contract. Any and all time tickets pertaining to this allowance are to be signed by Barton Malow and submitted on a daily basis. No time tickets will be accepted unendorsed. Allowance when billed shall be exclusive of mark-ups and fees. Include these costs in your base bid.

EXCLUDED FROM THIS CONTRACTOR'S WORK is:

1. N/A

SPECIAL CONSIDERATIONS:

1. All work under this scope shall comply with proper trade jurisdictions, even if it is necessary to assemble composite crews or subcontract to appropriate trades.
2. The special provisions outlined in **Section 00210 Description of the Work** form a part of this bid category work description and apply to this bidder's scope of work.
3. This Bidder is required to submit alternate prices identified in the Bidding Documents which pertain to their work. These alternate prices must be separate from their base bid on the Bid Proposal Form as described in Section 00200 Instructions to Bidders.
4. Take special precautions when working near occupied spaces with regards to fumes, noise and pollution levels. Some work may be necessary to be performed after the school day is over at this contractor expense.
5. Any in-place temporary protection that requires any disassembly to perform work, etc. must be replaced by contractor installing new work. Temporary protection must be restored to condition intended.
6. Section **00410, Familial Disclosure Statement**, **must** be filled out and included with your Bid for your Bid to be accepted.

END OF SECTION 00220 – GENERAL TRADES 6.2

**SECTION 00220
WORK SCOPE**

BID CATEGORY - Mechanical 15.1

The Work of this Bid Category includes but is not limited to providing all labor, equipment, materials, scaffolding, hoisting and incidentals to complete all **mechanical, plumbing, fire protection, and other specified items** in accordance with the Contract Documents and applicable codes. All Work is to be performed as shown on the plans and specified in the following technical Specification sections:

<u>Section</u>	<u>Name</u>
01731	Cutting and Patching
01732	Selective Demolition
07841	Through-Penetration Firestop Systems
07920	Joint Sealants
All 15000	Mechanical

In addition to the above, this Bid Category requires adherence to but not limited to the Bidding Documents, the Bidding and Contract requirements and Division 1 General Requirements of the Project Manual and coordination with various other technical Specifications interfacing with this Work. The Bidder is advised to review the Work descriptions of the other Bid Categories as set forth in Section 00210 of the Project Manual so as to not misunderstand scope responsibilities.

THE SCOPE OF WORK IS TO INCLUDE, but is not limited to, the following items:

1. There is no demolition contractor in this bid package. This contractor is responsible for demolition in his/her sections as well as the demolition as it is noted on the Architectural Demolition Notes, which can be found behind Project Manual section 00210 – Description of the Work/Special Provisions. These work scope assignments are to be included in your base bid.
2. Include the costs for any overtime necessary to meet substantial completion of July 19, 2007. Please review project manual section 00230 – Schedule and Phasing for further clarification.
3. Include mechanical, plumbing, fire protection and HVAC demolition as shown on plans. Salvaged items, cutting and capping lines is this contractor’s responsibility. Capping lines in building units that will be connected to future lines, in adjacent units at different times, is the responsibility of this contractor.
4. Furnish all labor, tools, equipment, material and services necessary to install all mechanical systems complete.
5. Furnish and install all required ductwork.
6. Provide final adjustments and cleaning of equipment and provide Owner training with demonstrations to operate equipment.
7. 15.1 - Mechanical will provide layout drawings for through wall penetrations of mechanical systems to 6.2 – General Trades at least two weeks prior to block installation. It is this contractor’s responsibility to review CMU openings and provide documentation of a sign off

- sheet by both parties. Once this sheet is sent to BMC, 15.1 – Mechanical will assume all responsibility for openings.
8. Removal and replacement of existing diffusers and any other mechanical equipment necessary for the ceiling grid and tile replacement is the responsibility of this contractor.
 9. Removal and replacement of existing ceiling tile and grid to remain is the responsibility of this contractor. Refer to demo plans and notes for more information.
 10. Furnish and install sleeves required for this contractor's work to 6.2 – General Trades contractor where applicable.
 11. Furnish mechanical sleeves necessary for your work, to be installed by 6.2 – General Trades contractor.
 12. Include all saw cutting, excavation, backfill and concrete infill as indicated on mechanical and plumbing and HVAC drawings to install new mechanical systems. Remove concrete and spoils from site.
 13. Include labor to readjust any such penetrations just prior to any activity that will permanently lock such rough-ins in place, i.e., roof sump pans.
 14. Furnish all new mechanical equipment, systems, and components as indicated on the drawings as required for complete systems.
 15. This contractor is responsible to make all connections to tie-in all sanitary piping, domestic water, and roof drains.
 16. The contractor's field superintendent shall be present during testing and field reviews conducted by inspection agencies.
 17. Coordinate delivery, receive, unload, store and protect all mechanical equipment. Maintain insurance for equipment in transit, while stored on or off site until equipment is installed.
 18. Provide all duct and pipe insulation AND labeling as shown and specified.
 19. Furnish and install fire dampers where ductwork penetrates rated wall assemblies. Ensure engineers drawings comply with life safety codes for rated walls.
 20. Provide all trouble shooting and diagnosis of malfunctioning mechanical systems.
 21. Test all systems to assure complete and proper functioning of installation and notify BMC when systems are complete.
 22. All ductwork shall be kept clean and protected throughout construction. Install necessary coverage at existing branches and/or install temporary fillers to be changed out prior to testing, adjusting and balancing. Provide final cleaning, dusting and washing as needed of all materials, equipment, fixtures and systems installed and/or supplied under this work category. Coordinate the time of implementation with the Construction Manager.

23. Install weather and joint sealants for newly installed equipment. At floors, use backer rod to cover shims and seal.
24. Caulk all products installed by this contractor where required for work of this category.
25. Furnish and install all fire stopping necessary to seal penetrations related to mechanical system installations. Use UL approved products. Maintain indicated fire rating of walls, partitions, ceilings and floors at penetrations.
26. Provide all necessary barricades, safety and warning devices for this work.
27. Furnish access panels and layout locations to 6.2 – General Trades contractor. These panels may not be shown on drawings but are necessary for the end user to maintain and access this system.
28. Obtain and pay for all local, state and municipal permit and/or fees required for the execution of the work. On Plumbing Permit Application check Box 24, Certification Fee and include \$10.00. **On Mechanical Permit Application check Box 36, Certificate Fee, and include \$10.00. These certificates will be turned over to the construction manager with close out documents.**
29. Contractor of this work category shall locate and layout all elevations and locations of pipe or ductwork penetrations required by this category for shown locations. Penetrations required, but not shown, by this work category shall be approved by the Architect prior to installation. A qualified masonry contractor must perform penetrations through masonry that will be exposed to view. Costs for all penetrations required to complete the work of this category will be the responsibility of the Mechanical Contractor.
30. Cutting and welding operations shall cease 2 hours prior to the close of construction each day to minimize the risk of undetected smoldering fire. Contractors performing such operations shall have within their immediate work area, ABC-type fire extinguishers.
31. A walk through must be taken with the Construction Manager, Owner's Representative, Building Head Custodian prior to ceiling tile installation to locate all above ceiling valves. All valves must have location labeled below ceiling level. Documentation of this walk through must be given to Construction Manager in writing the day after the walk through takes place.
32. Complete as-built drawings on reproducibles as specified. Refer to Section 01330-5.03-E for costs associated with this item.
33. Dispose of all unusable material in dumpster daily. Dumpsters will be provided by. It is the responsibility of each contractor to dispose of their own spoils off site.
34. Provide daily clean-up, according to Barton Malow standards, including daily removal of all materials and debris related to this category. If daily clean-up is not performed, the Construction Manager will provide his labor to complete the clean-up and the appropriate contractor will be back-charged.

EXCLUDED FROM THIS CONTRACTOR'S WORK is:

1. N/A

SPECIAL CONSIDERATIONS:

1. All work under this scope shall comply with proper trade jurisdictions, even if it is necessary to assemble composite crews or subcontract to appropriate trades.
2. The special provisions outlined in **Section 00210 Description of the Work** form a part of this bid category work description and apply to this bidder's scope of work.
3. This Bidder is required to submit alternate prices identified in the Bidding Documents which pertain to their work. These alternate prices must be separate from their base bid on the Bid Proposal Form as described in Section 00200 Instructions to Bidders.
4. Take special precautions when working near occupied spaces with regards to fumes, noise and pollution levels. Some work may be necessary to be performed after the school day is over at this contractor expense.
5. Any in-place temporary protection that requires any disassembly to perform work, etc. must be replaced by contractor installing new work. Temporary protection must be restored to condition intended.
6. Section **00410, Familial Disclosure Statement**, **must** be filled out and included with your Bid for your Bid to be accepted.

END OF SECTION 00220 - MECHANICAL 15.1

**SECTION 00220
WORK SCOPE**

BID CATEGORY – Electrical 16.1

The Work of this Bid Category includes but is not limited to providing all labor, equipment, materials, scaffolding, hoisting and incidentals to complete all **fire alarm, lighting protection, selective demolition and electrical systems and items specified** in accordance with the Contract Documents and applicable codes. All Work is to be performed as shown on the plans and specified in the following technical Specification sections:

<u>Section</u>	<u>Name</u>
01230	Alternates
01731	Cutting and Patching
01732	Selective Demolition
07841	Through-penetration Firestop Systems
07920	Joint Sealants
All 16000	Electrical

In addition to the above, this Bid Category requires adherence to but not limited to the Bidding Documents, the Bidding and Contract requirements and Division 1 General Requirements of the Project Manual and coordination with various other technical Specifications interfacing with this Work. The Bidder is advised to review the Work descriptions of the other Bid Categories as set forth in Section 00210 of the Project Manual so as to not misunderstand scope responsibilities.

THE SCOPE OF WORK IS TO INCLUDE, but is not limited to, the following items:

1. There is no demolition contractor in this bid package. This contractor is responsible for demolition in his/her sections as well as the demolition as it is noted on the Architectural Demolition Notes, which can be found behind Project Manual section 00210 – Description of the Work/Special Provisions. These work scope assignments are to be included in your base bid.
2. Include the costs for any overtime necessary to meet substantial completion of July 19, 2007. Please review project manual section 00230 – Schedule and Phasing for further clarification.
3. This contractor will disconnect and remove all existing electrical items and reinstall where necessary, as shown and required. Disconnect power to mechanical equipment to be removed by others. This contractor will connect all new electrical systems to existing systems and provide all new work on existing systems, as required. This contractor is responsible for protection of all existing electrical equipment and systems to remain.
4. Provide power to all mechanical equipment consistent with mechanical schedules and specifications from nearest panel unless noted otherwise.
5. Furnish electrical sleeves and provide layout, as necessary for your work, to be installed by the 6.2 – General Trades contractor.
6. Employ services of a registered surveyor to perform layout of all electrical work.
7. It is this contractor’s responsibility to provide any and all electrical testing and inspections as listed in the electrical specifications.

8. This contractor to provide and install duct smoke detectors. Interlock duct smoke detectors for shutdown upon activation.
9. Employ services of a reputable company to locate existing underground technology and power to eliminate damage to existing services for installation of new work.
10. Complete demolition, cutting, capping, temporary service connections and/or return to service as indicated on the electrical demolition plans and notes. Turn over salvaged items as directed. Maintain and/or provide safe electrical systems while in a temporary status.
11. All existing furniture, equipment, etc. will remain in each room during lighting replacement. It is this contractor's responsibility to work around all owners' furniture, equipment, etc. It is also the responsibility of this contractor to clean each room as work is completed.
12. Sawcut, remove and dispose of concrete, asphalt and/or greenbelt required to install the work of this category. Patch and restore as necessary in these areas.
13. Furnish and install all labor and material to install all electrical site elements complete. Concrete pole bases are this contractor's responsibility. This contractor is responsible for the re-seeding of disturbed green belt areas due to this contractor's work.
14. Furnish all access panels required to service the electrical systems but which are not shown on the drawings to the carpentry contractor.
15. Protect all thru-wall, floor and ceiling penetrations against damage. Include cost to re-adjust such rough-ins just prior to secured in-place. Coordinate this adjustment with the appropriate contractor.
16. Install blank covers at all abandoned boxes.
17. The 6.2 – General Trades and 16.1 - Electrical contractors will share the responsibility for a square / plumb installation of all electrical and technology boxes, any cost incurred to adjust boxes to ensure a quality finished product will be shared by these contractors.
18. Furnish all concrete equipment pads required for electrical equipment needed but not shown on the drawings.
19. Supply power to all mechanical fire/smoke dampers, and any other dampers requiring power.
20. Coordinate delivery, receive, unload, store and protect all electrical equipment. Maintain insurance for equipment in transit, while stored on or off site until equipment is installed.
21. Coordinate electrical device locations with architectural elements, i.e. tack boards, casework and marker boards prior to installation of electrical boxes to avoid installation conflicts.
22. The contractor's field superintendent must be present during testing and field reviews conducted by inspection agencies.
23. All contactors must be labeled on the front of the box as to what they control. If located above ceilings the location must be noted below ceiling level.

24. A walk through with the Construction Manager, Owner Representative, and building head custodian must be done and documented prior to completion of the project to show the location of all above ceiling control devices.
25. All panel boxes must be labeled with permanent room numbers.
26. Provide and maintain all necessary barricades, safety and warning devices until work is safe and complete.
27. Provide and install all fire stopping and joint sealants necessary to seal penetrations related to electrical system installations. Use UL approved products. Maintain indicated fire rating of walls, partitions, ceilings and floors at penetrations.
28. Obtain and pay for all necessary state and local permits, fees and insurance to perform this work. **On Electrical Permit Application check box 30 Certificate Fee and include \$10.00.** This certificate will be turned over to the construction manager with close out documents.
29. Submit fire alarm shop drawings to governing agencies for approval 3 weeks after award of 16.1 – Electrical contract. Since this contractor is specialized and working under performance specifications, added devices in new areas from State review will NOT be compensated for.
30. The manufacturer for occupancy sensors listed in Specification Section 16145 – Lighting Control Devices shall be Leviton ONLY.
31. Provide and install all lighting and associated wiring indicated on the drawings and specified in Section 16145.
32. Complete as-built drawings on reproducibles as specified, Refer to Section 01330-5.03-E for costs associated with this item.
33. With regard to Specification Section 13845, install all light control contactors and LCP's provided by 15.2 (Lighting and Temperature Controls) contractor. All branch circuit relay switching and rough-ins for low voltage switches is the responsibility of this contractor.
34. Install only temperature sensors as specified in 15900. Include rough-in of temperature sensor device in this contractors work.
35. Provide and install all conduit rough-ins for wall mounted thermostats, sensors and lighting control switches as shown on mechanical and electrical drawings. Minimally, each rough-in should consist of a single gang switch box with ½" EMT turning out above finished ceiling on the same side of the wall as the equipment, which is served by the thermostat, sensor or switch. Coordinate this work with 15.2 – Temperature and Lighting Controls contractor as certain sensors or lighting control switches may require alternate rough-on requirements that are to be included in your base bid.
36. It is this contractor's responsibility to ensure that all occupancy sensors or power packs have auxiliary contacts needed for BMS systems, per details.
37. Dispose of all unusable material in dumpster daily. Dumpsters will be provided by BMC. It is the responsibility of each contractor to dispose of their own spoils off site.

38. This contractor is responsible to bring a documented schedule of completion to the post bid meeting, broken down by building area.
39. Provide daily clean-up, according to Barton Malow standards, including daily removal of all materials and debris related to this category. If daily clean-up is not performed, the Construction Manager will provide his labor to complete the clean-up and the appropriate contractor will be back-charged.
40. Include a \$2,500 allowance for miscellaneous items. Allowance to be used on a time and material basis as directed by BMC. Unused portions will be deducted from contract. Any and all time tickets pertaining to this allowance are to be signed by Barton Malow and submitted on a daily basis. No time tickets will be accepted unendorsed. Allowance when billed shall be exclusive of mark-ups and fees. Include these costs in your base bid.

EXCLUDED FROM THIS CONTRACTOR'S WORK is:

1. N/A

SPECIAL CONSIDERATIONS:

1. All work under this scope shall comply with proper trade jurisdictions, even if it is necessary to assemble composite crews or subcontract to appropriate trades.
2. The special provisions outlined in **Section 00210 Description of the Work** form a part of this bid category work description and apply to this bidder's scope of work.
3. This Bidder is required to submit alternate prices identified in the Bidding Documents which pertain to their work. These alternate prices must be separate from their base bid on the Bid Proposal Form as described in Section 00200 Instructions to Bidders.
4. Take special precautions when working near occupied spaces with regards to fumes, noise and pollution levels. Some work may be necessary to be performed after the school day is over at this contractor expense.
5. Any in-place temporary protection that requires any disassembly to perform work, etc. must be replaced by contractor installing new work. Temporary protection must be restored to condition intended.
6. Section **00410, Familial Disclosure Statement**, **must** be filled out and included with your Bid for your Bid to be accepted.

END OF SECTION 00220 - ELECTRICAL 16.1

**SECTION 00230
SCHEDULE AND PHASING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 MILESTONE SCHEDULE

- A. The following are the milestone schedule dates for the listed work and will become a part of the Contract Documents. Each contractor is responsible to review the supplementary General Conditions for additional requirements. The master construction schedule will be developed after award of the Agreement with Contractor input.

MILESTONE ACTIVITIES	SCHEDULED START	SCHEDULED COMPLETION
Last pre-bid RFI taken	March 07, 2007	-
Receive Bids	March 20, 2007	
Issuance of Contracts (tentatively)	April 03, 2007	-
Concessions' Remodeling	June 20, 2007	July 18, 2007
Walk in Cooler Delivery & Install	July 03, 2007	
Punch list	July 19, 2007	August 1, 2007
OFS Inspection	August 03, 2007	

Close coordination will be required between all construction trades in order that individual areas of renovation and new construction can be completed within the scheduled time. Consult the proposed construction sequence and renovation sequence schedules and key plans found in Part 2 for start and completion dates of individual Work areas.

- B. It is expressly agreed that time is of the essence for the completion of Work under the Agreement and **Contractor** agrees to perform the Work within the allotted time and in the manner specified. **Contractor** shall be liable for any and all damages and expenses suffered by the Owner or Barton Malow Company arising or resulting from the failure of **Contractor** to perform the Work in accordance with the construction schedule.

1.03 CONSTRUCTION SCHEDULE DEVELOPMENT PROCESS

- A. **Contractor** agrees to commence Work in the field within five (5) Days after being notified to do so by the Barton Malow Company. **Contractor** shall diligently perform and fully complete all Work to the satisfaction of Barton Malow Company and Owner.

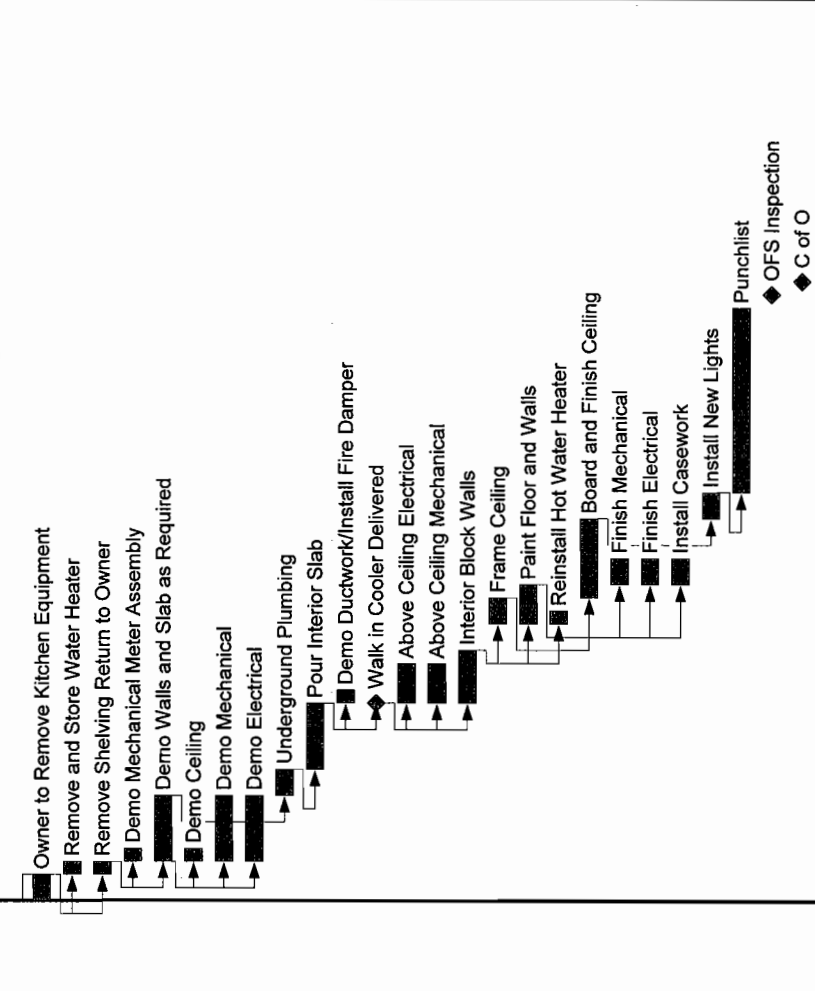
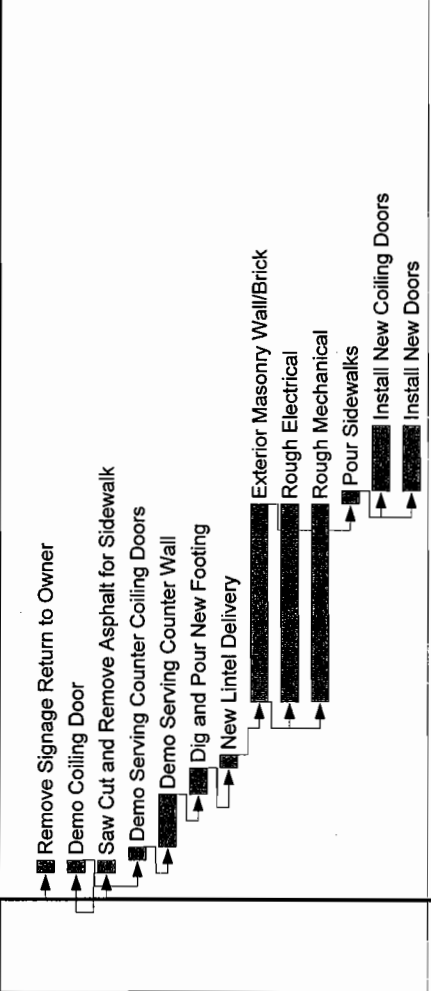
Work shall begin at such points as Barton Malow Company may designate and shall be carried to completion with the utmost speed.

- B. **Contractor** shall submit to Barton Malow Company **within fifteen (15) Days of award of the Agreement a Bar Chart/CPM construction schedule using all necessary scheduling information using Barton Malow Company specified coding** of all activities contained in the **Contractor's** scope of Work. This schedule shall include activity descriptions and durations in working days, for shop drawings, fabrication, delivery and installation of products, materials and equipment. This schedule shall identify precedent relationships between **Contractor's** activities and those of other **contractors**, the dollar value, necessary manpower loadings, and precedent activities for other **contractors**. The activities on the schedule must be at a level of detail approved by Barton Malow Company and should agree with the terminology and building sequencing established by Barton Malow Company.

- C. Barton Malow Company will compile all **Contractors'** schedules and develop a project master construction schedule. Once the individual **Contractors** schedules are agreed upon by Barton Malow Company, this project master construction schedule will become the project plan for construction.
- D. Special requirements and/or sequencing issues should be brought to the attention of Barton Malow Company. It is intended the milestones remain in effect and all Bidders agree to accept the milestone dates. Barton Malow Company reserves the right to revise the project master construction schedule as deemed necessary.
- E. Barton Malow Company shall periodically update the project master construction schedule and display it at the Project site. Contractor shall familiarize itself with the project master construction schedule and how it will affect or modify its operations, including coordination with the activities of other **contractors**. Reasonable changes in sequencing, durations and phasing are to be expected with each master schedule update. These changes will be made by **Contractor** at no additional cost.
- F. If it is apparent **Contractor** is unable to perform its Work in the sequence indicated or the time allotted, **Contractor** must notify Barton Malow Company within five (5) Days after initial publication of the project master construction schedule. **Contractors** schedule of activities may be re-sequenced, and the schedule may be adjusted, provided all Work is completed within the stated milestone dates and provided Barton Malow Company and affected **contractors** are notified of the change within five (5) calendar days of receipt of the schedule and the change does not otherwise negatively impact the other scheduled work; otherwise, the project master construction schedule shall be deemed accepted by all parties and becomes a contractual requirement for each **Contractor**.
- G. If **Contractor** delays progress for any reason other than those delays specifically excused under the Contract Documents, Contractor will take all necessary steps to expedite its Work to maintain milestone target dates at no expense or additional cost to Owner or Barton Malow Company.
- H. If **Contractor** is behind schedule and is so notified by Barton Malow Company, **Contractor** shall be required to accelerate the Work at its own expense. **Contractor** shall furnish to Barton Malow Company a short interval schedule of its Work showing location, number of men and crew required to get back on the agreed upon master construction schedule. If **Contractor** fails to maintain and meet the short interval schedule, **Barton Malow Company** reserves the right to take whatever steps it deems necessary in its sole discretion to recover the schedule at the **Contractor's** expense. The **Contractor** shall employ such means as overtime work, multiple work shifts, and additional equipment, all without additional compensation, and shall continue to do so until the progress of the Work, in the opinion of Barton Malow Company, is in conformance with the master project construction schedule.
- I. **Contractor** agrees that it shall have no claim against the Owner, Architect, or Barton Malow Company for an increase in the contract price nor for a payment or allowance of any kind for damage, loss, or expense arising or resulting from delays, regardless of whether the delay is the basis for an extension of time. This provision includes claims for damage, loss, or expense arising or resulting from interruptions to, or necessary suspension of, **Contractor's** Work to enable other **contractors** to perform their work.

END OF SECTION 00230

Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish
Exterior Work					
1010	Remove Signage Return to Owner	1	1	20JUN07	20JUN07
1120	Demo Coiling Door	1	1	20JUN07	20JUN07
1121	Saw Cut and Remove Asphalt for Sidewalk	1	1	20JUN07	20JUN07
1130	Demo Serving Counter Coiling Doors	1	1	21JUN07	21JUN07
1132	Demo Serving Counter Wall	2	2	22JUN07 *	25JUN07
1150	Dig and Pour New Footing	2	2	26JUN07	27JUN07
1151	New Lintel Delivery	1	1	28JUN07	28JUN07
1190	Exterior Masonry Wall/Brick	10	10	03JUL07	17JUL07
1191	Rough Electrical	10	10	03JUL07	17JUL07
1192	Rough Mechanical	10	10	03JUL07	17JUL07
1193	Pour Sidewalks	1	1	18JUL07	18JUL07
1195	Install New Coiling Doors	3	3	19JUL07	23JUL07
1210	Install New Doors	3	3	19JUL07	23JUL07
Interior Work					
900	Owner to Remove Kitchen Equipment	2	2	18JUN07	19JUN07
1000	Remove and Store Water Heater	1	1	20JUN07	20JUN07
1020	Remove Shelving Return to Owner	1	1	20JUN07	20JUN07
1021	Demo Mechanical Meter Assembly	1	1	21JUN07	21JUN07
1040	Demo Walls and Slab as Required	3	3	21JUN07	25JUN07
1041	Demo Ceiling	1	1	21JUN07	21JUN07
1042	Demo Mechanical	3	3	21JUN07	25JUN07
1043	Demo Electrical	3	3	21JUN07	25JUN07
1045	Underground Plumbing	2	2	26JUN07	27JUN07
1046	Pour Interior Slab	3	3	28JUN07	02JUL07
1051	Demo Ductwork/Install Fire Damper	1	1	03JUL07	03JUL07
1052	Walk in Cooler Delivered	0	0	03JUL07	
1054	Above Ceiling Electrical	2	2	03JUL07	05JUL07
1055	Above Ceiling Mechanical	2	2	03JUL07	05JUL07
1100	Interior Block Walls	3	3	03JUL07	06JUL07
1102	Frame Ceiling	2	2	09JUL07	10JUL07
1220	Paint Floor and Walls	3	3	09JUL07	11JUL07
1221	Reinstall Hot Water Heater	1	1	09JUL07	09JUL07
1222	Board and Finish Ceiling	4	4	11JUL07	16JUL07
1230	Finish Mechanical	2	2	12JUL07	13JUL07
1240	Finish Electrical	2	2	12JUL07	13JUL07
1250	Install Casework	2	2	12JUL07	13JUL07
1270	Install New Lights	2	2	17JUL07	18JUL07
1310	Punchlist	10	10	19JUL07	01AUG07
1330	OFS Inspection	0	0		02AUG07 *
1360	C of O	0	0		03AUG07 *



Start date	18JUN07
Finish date	03AUG07
Data date	18JUN07
Run date	13FEB07
Page number	1A
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Troy School District Athens High School Concession Stand

Early bar
 Progress bar
 Critical bar
 Summary bar
 Start milestone point
 Finish milestone point

**SECTION 00400
BID PROPOSAL FORM
(Submit in Triplicate)**

DATE: _____

**TO: Troy School District
4400 Livernois Road
Troy, MI. 48098**

**PROJECT: Athens High School
Concessions' Remodeling
Bid Package No. 9393**

**Attn: Barton Malow Company
1301 Boyd
Troy, MI 48083
Call 248-823-4631, with any questions**

Architect: Kingscott Associates, Inc.

FROM:

Name of Bidder: _____

Business Address: _____

Phone Number: _____

Fax Number: _____

**Bid Proposal for
Category(ies):** _____

Bidder, in compliance with the **Advertisement to Bid** for construction contemplated for **Bid Package No. 9393 Athens High School Concessions' Remodeling** having carefully examined the Bidding Documents and the site of the proposed Project and the conditions affecting the proposed Work in the Bid Category(ies) including the condition of the Project site, any surface or subsurface obstruction, the actual levels, all excavating, filling in, removal and demolition, measurements and quantities involved in the Work, the availability of labor, materials and equipment, and the weather conditions that may possibly may be experienced in the Project vicinity, proposes to furnish all labor, materials, tools, equipment, machinery, equipment rental, transportation, superintendence, and services as are necessary to perform all Work in the Bid Category(ies) stated in accordance with the Contract Documents for the Base Bid and Alternate amounts stated below.

If identified as one of the apparent lowest responsive, responsible bidder(s) for a Bid Category Bidder agrees to meet immediately with the Barton Malow Company and shall submit post bid information as described in Section 00200 Instructions to Bidders.

Bidder, if awarded a contract, agrees to: (1) execute the Agreement within fifteen (15) days of receiving notice of the award; (2) provide performance/payment bonds and insurance certificates in full compliance with the Contract Documents, (3) submit the Project Safety Program as described in Section 00200 Instructions to Bidders; (4) commence Work upon execution of the Agreement or at such other time as directed in the notice of award, and (5) to complete its Work in accordance with the Contract Documents and within the milestone activity dates and durations set

forth in the Bidding Documents and subsequent construction project master schedule established by Barton Malow Company.

In the event Bidder defaults in complying with any portion of this paragraph, Bidder specifically agrees that the entire bid security amount shall become the property of **Troy School District** as liquidated damages constituting the reasonable estimate of the damages that Troy School District would incur for delays and additional expenses in the event of such default, and not as a penalty.

BASE BID: Bidder agrees to perform all Work for Bid Category(ies) as described in the Contract Documents, for the Base Bid(s) stated below. The Base Bid(s) shall include the cost of Performance and Payment Bonds. For each Bid Category to be bid, include the Base Bid, written and in figures, the cost of the Performance Bond and Payment Bond which is included in the Base Bid, written and in figures, and the Bid Category and description. The cost of the Performance Bond and Payment Bond shall be treated as a deduct Alternate should the Owner and Barton Malow Company decide to waive the requirement for the successful Bidder providing same.

(Show amounts in both words and figures. In case of discrepancy, amount shown in words will govern).

BASE BID MUST INCLUDE BID AMOUNTS FOR ALL OF PHASE II TROY HIGH SCHOOL. BIDS THAT DO NOT INCLUDE A PRICE FOR ALL WORK WILL NOT BE ACCEPTED.

BID CATEGORY	WRITTEN DESCRIPTION/AMOUNT(S)	BID AMOUNT IN FIGURES
1. Bid Category No. _____ Base Bid (including bond)	_____	\$ _____
	DOLLARS	
Amount included for bond	_____	\$ _____
	DOLLARS	

COMBINED BID: Bidder agrees to perform all Work necessary to complete the Work in Bid Categories _____, _____, _____, in full accordance with the Contract Documents, for the lump sum of:

COMBINED BID AMOUNT	WRITTEN DESCRIPTION AMOUNT(S)	BID AMOUNT IN FIGURES
Base Bid (including bond)	_____	\$ _____
	DOLLARS	
Amount included for bond	_____	\$ _____
	DOLLARS	

ALTERNATES: The following Alternate(s) to Base Bid(s) are required to be offered by the respective bidders. Further description of these alternates can be found in Kingscott Specification Section 01230 Alternate. In the event the Alternate is accepted, Bidder agrees to perform all Work necessary to complete the Work as modified by the Alternate in full accordance with the Contract Documents, for the following add or deduct from the Base Bid as indicated: (Show amount(s) in both words and figures for Alternates. In case of discrepancy, amount shown in words will govern.)

ALTERNATES:

A-1 Replace existing doors & frames as designated w/ new FRP doors & aluminum frames. Refer to door schedule & specifications for additional information.

BID CATEGORY	WRITTEN DESCRIPTION OF ALTERNATE AMOUNT(S)	ADD	DEDUCT
6.2		\$	\$

For the amount of: _____
 _____ DOLLARS

A-2 Provide permanent awning sized as shown on plans, equal to Eide Industries, Inc.; standard w/ rigid valance, full frame w; rafter spacing @ 19-1/2" o.c., shadow free graphic zone, 2" SQ., 16 GA. galv. steel tubing frame – painted polyester powder coat white. Underside eggcrate ceiling, 1 row of double tube 800 MA high output fluorescent fixtures, water resistant, cooley brite fabric (black lightable) – red color to be selected from manuf. Standard colors. Provide design engineering to meet 25 psf snow load & 90 mph wind load. Provide graphic lettering on 8" valance (on North awning facing football field) to read "Athens Redhawks" in color to be selected from manuf. Standard colors.

BID CATEGORY	WRITTEN DESCRIPTION OF ALTERNATE AMOUNT(S)	ADD	DEDUCT
6.2		\$	\$

For the amount of: _____
 _____ DOLLARS

A-2 Lit canopies around building: All type "S4" wallpack lighting shall be eliminated, and circuiting/control shall feed canopy lighting.

BID CATEGORY	WRITTEN DESCRIPTION OF ALTERNATE AMOUNT(S)	ADD	DEDUCT
16.1		\$	\$

For the amount of: _____ DOLLARS

VOLUNTARY ALTERNATES: The following Voluntary Alternates are offered by the Bidder. Bidder agrees that the amounts indicated below shall be added to or deducted from the Base Bid, as indicated, for each voluntary Alternate that is accepted.

(Show amount(s) in both words and figures for voluntary alternates. In case of discrepancy, amount shown in words will govern.)

BID CATEGORY	WRITTEN DESCRIPTION OF VOLUNTARY ALTERNATE AMOUNT(S)	ADD	DEDUCT
1.		\$	\$

For the amount of: _____ DOLLARS

2.		\$	\$
----	--	----	----

For the amount of: _____ DOLLARS

3.		\$	\$
----	--	----	----

For the amount of: _____ DOLLARS

UNIT PRICES: The following Unit Prices to Base Bid Categories are required to be offered by the respective Bidders. Bidder agrees that the following amounts will be used in determining contract changes from the Base Bid for authorized Changes in the Work. Bidder shall not include these unit costs in the Base Bid amount(s). [All unit prices shall include Bidder's mark-up for overhead and profit.]

	BID CATEGORY CODE	DESCRIPTION OF UNIT PRICE	UNIT PRICE	
			ADD	DEDUCT
1.	6.2	Concrete 3000 PSI cu. yd.	\$	\$
2.	6.2	3" Asphalt cu. yd.	\$	\$
3.	6.2	Drywall patch ready for paint sq. ft.	\$	\$
4.	6.2	Painting sq. ft.	\$	\$
5.			\$	\$

All applicable taxes and bond costs are included in the above Base Bid and all listed Alternates and Unit Prices.

Bid Security in the form of a bid bond from a qualified surety (), certified check (), or cashier's check (), (check one) accompanies this proposal in the amount of five (5) percent of the Base Bid amount(s). Bidder agrees that this Bid Proposal shall be irrevocable for a period of **ninety (90)** days after the day and time designated for receipt of the Bid Proposal in Section 00100 of the Project Manual.

As of the date of submission of the Bid Proposal, Bidder's worker's compensation Experience Modification Rate (EMR) for the state in which the Work is to be performed is _____. Bidder has attached to the Bid Proposal form the following (3) forms:

1.) OSHA Form 300 indicating recordable incidence rates for the last calendar year per 200,000 man-hours for the following categories:

- 1) Total Cases _____
 - 2) Lost Workday Cases _____
 - 3) Non-fatal Cases Without Lost Workdays _____
 - 4) Employee Hours Worked Last Year _____
 - 5) Fatalities in the last year (if yes describe below) _____
- _____
- _____
- _____

2.) Affidavit of Bidder (Familial Relationship Disclosure) Form located in section 00410

Has Bidder been cited by state of federal OSHA for any serious or willful violation? If yes, please describe:

Bidder understands that **Troy School District** reserves the right to reject any or all Bid Proposals and to waive any informalities or irregularities therein.

Bidder acknowledges receipt of the following Addenda (identify no. and date of each): _____

Bidder acknowledges receipt of the pre-bid conference minutes dated _____

If awarded a contract, Bidder's surety will be _____

Check

I have included a fully executed and notarized copy of the familial disclosure form set forth in Section 00410 of this Project Manual with my Bid Proposal.

Bidder accepts the provisions of the Bidding and Contract Documents and certifies that this Bid Proposal is submitted in good faith and without collusion with any other person or entity submitting a Bid Proposal for the Work. If Bidder is required to be licensed in the state where the work is performed add "Bidder certifies that it meets all licensing requirements of the state in which work is to be performed, its current license number and classification are as follows: _____". Bidder hereby affixes its authorized signature(s) representing (check one):

- _____ An individual doing business as _____
- _____ A partnership
- _____ A limited liability company, organized in _____ (enter state)
- _____ A corporation, organized in _____ (enter state)
- _____ Joint venture formed between _____ and _____
(Signature from authorized representatives of each partner are required)

Signature(s): _____ Title: _____
_____ Title: _____

Name of firm: _____

Business address: _____

Telephone no.: () _____

END OF SECTION 00400

**SECTION 00410
FAMILIAL RELATIONSHIP DISCLOSURE FORM
AFFIDAVIT OF BIDDER**

All Bidders must complete the following familial disclosure form in compliance with MCL 380.1267 and attach this information to the Bid Proposal.

The undersigned, the owner or authorized officer
of _____ (the "Bidder"),

pursuant to the familial disclosure requirement provided in the Advertisement for Bid, Section 00100 of the Project Manual, hereby represents and warrants, except as provided below, that no familial relationships exist between the Owner(s) or any employee of _____ and any member of the Board of Education of the School District or the Superintendent of the School District.

List and describe any Familial Relationships:

BIDDER:

By: _____

Its: _____

STATE OF MICHIGAN

COUNTY OF _____

Subscribed and sworn to before me on the _____ day of _____ 2005, by

Notary Public

_____ County, Michigan

My Commission Expires _____

Acting in County of _____

END OF SECTION 00410

**SECTION 00500
AGREEMENT FORM**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to the requirements described in Section 00700 General Conditions of the Contract and Section 00800 Supplementary General Conditions.

1.02 AGREEMENT FORM

- A. The form of Agreement that will be used for Work under this Bid Package shall be **AIA 101/CMA Document - 1992 Edition**.
 - 1. The above Agreement Form is **behind this section**.
 - 2. Comments:
 - Refer to section 00880 Regulatory Requirements for tax requirements.
 - Refer to Section 01290 Payment procedures for payment process

END OF SECTION 00500

**SECTION 00610
BONDS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to the requirements described in Section 00200 Instructions to Bidders regarding preparing a Bid Security to be delivered at time of bid.

PART 2 - BOND REQUIREMENTS

2.01 PERFORMANCE BONDS AND PAYMENT BONDS

- A. Troy School District will, require Contractor to furnish a Performance Bond and a Payment Bond, in amounts equal to the Agreement price, by a qualified surety naming both the Owner and Barton Malow as Obligees. All sureties providing bonds on this Project must be listed in the Department of Treasury's Circular 570, entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" with the bond amounts less than or equal to the underwriting limitation indicated in the Circular, and/or must have an A.M. Best rating of A - or better. Bonds shall be duly executed by the Contractor, as principal, and by a surety that is licensed in the state in which the Work is to be performed.
- B. The Contractor shall deliver the required bonds to Barton Malow Company prior to execution of the Agreement. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder, at a minimum, shall submit evidence to the satisfaction of Barton Malow Company that such bonds will be furnished prior to commencement of on site Work. In no event may the Contractor commence on-site Work without the required bonds properly issued and delivered.
- C. Performance Bond and Payment Bond form AIA Document A312 (1984 Edition) must be used for this Project.
- D. The Bidder's proposed surety must be acceptable to the Owner and Barton Malow Company. If, at any time, after acceptance of the Contractor's bonds, the surety fails to meet the criteria stated in Paragraph 2.01A. above, the Contractor must, as a precondition to continuing Work and receiving further payments, replace the bonds with bonds from a surety that meets the stated criteria.
- E. The Performance and Payment Bond penal sums (i.e. the Agreement price) must be listed as a separate line item in the schedule of values described in Section 01290 Payment Procedures in the Project Manual.
- F. In the event of a Change Order to the Agreement that increases the Agreement price, the penal sum of any required Performance and Payment Bonds shall also be increased so that each penal sum equals the adjusted Agreement price, or such other percentage of the Agreement price listed in the Project Manual - Section 00200 -Instructions to Bidders. Barton Malow Company or Owner shall have the right to request submission of bond riders, issued by the original qualified surety, evidencing that such increase to the penal sum of the bonds has been accomplished. Notwithstanding the foregoing, in the next pay application after the Agreement price has been increased by twenty-five percent (25%) or more, as a condition precedent to payment, Contractor shall deliver a bond rider issued by the original qualified surety evidencing that the appropriate increase in penal sums has been accomplished. See Project Manual Section 01290 - Payment Procedures.

END OF SECTION 00610

**SECTION 00620
INSURANCE**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. A sample of the Certificate of Insurance (ACORD) form is in Section 01600 Forms.

1.02 STANDARD INSURANCE REQUIREMENTS

- 1. Barton Malow Company Contractor Insurance Requirements for Agency Work, PRO 15.14, shall govern this Project. A copy of these Insurance Requirements is attached in this Section, immediately following this page.

**BARTON MALOW COMPANY
CONTRACTOR
INSURANCE REQUIREMENTS**

For agency work

1. As a condition of performing work under the Agreement, Contractor will keep in force, at all times during performance of the Work, policies of insurance covering all Basic Insurance Requirements and any applicable Supplemental Insurance Requirements. The requirements identified below are minimum requirements. If the Agreement or other Contract Documents impose additional or higher standards, Contractor shall meet those as well. Where a Controlled Insurance Program ("CIP") is specified in the Contract Documents, these insurance requirements shall not apply to coverages supplied by the CIP, but shall apply to coverages which Contractor is required to carry outside the scope of the CIP.
2. Basic Insurance Requirements
 - 2.1. Workers' Compensation covering Contractor's statutory obligations in the State(s) in which the Work is to be performed or Federal statutory obligations, if applicable to the Project, and Employers' Liability insurance with limits of liability of \$1,000,000 per accident. Where applicable, a US Longshore and Harborworker's Compensation Act endorsement must be included.
 - 2.1.1. If Contractor employs the services of leased employees for the Work or for a portion of the Work, it will be required to submit evidence, to the satisfaction of Barton Malow Company, that such leased employees are fully covered by the minimum limits of Workers' Compensation and Employers' Liability Insurance. Such evidence shall include, but not be limited to, submission of the applicable leasing agreement.
 - 2.2. Automobile Liability insurance with the limit of \$1,000,000 per accident covering Contractor's owned, non-owned and hired automobiles.
 - 2.3. Commercial General Liability insurance written on the 1988 ISO OCCURRENCE policy form or subsequent versions with limits of liability as follows:

General Aggregate	\$2,000,000
Products-Completed Operations Aggregate	\$2,000,000
Personal/Advertising Injury	\$2,000,000
Each Occurrence	\$2,000,000

This coverage shall include coverage for premises-operations, independent contractors' protective, products and completed operations, personal injury and broad form property damage (including coverage for explosion, collapse, and underground hazards), and Contractual Liability protection with respect to Contractor's indemnification obligations under the Contract Documents. Products-completed operations coverage must be maintained for at least two years after final completion of the Project.
3. Supplemental Insurance Requirements
 - 3.1. Watercraft Protection and Indemnity Liability insurance if any of the Work is on or over navigable waterways or involves use of any vessel. Limits are to be approved by Barton Malow Company in writing.
 - 3.2. Aircraft Liability insurance if any aircraft is used in performance of the Work. Limits are to be approved by Barton Malow Company in writing.
 - 3.3. Railroad Protective Liability insurance if any of the Work is on or within 50 feet of any railroad or affects railroad property, including but not limited to tracks, bridges, tunnels, and switches. Limits are to be approved by Barton Malow Company in writing.
 - 3.4. Professional Liability insurance, if Professional Services are provided, with limits of liability as follows:

Each Claim	\$5,000,000
Aggregate	\$5,000,000

Contractor shall keep such Professional Liability insurance in force during the Agreement, and for three years after final completion of the Project.
 - 3.5. Pollution Liability insurance, which must be on an occurrence basis, if Environmental Services are provided. "Environmental Services" means any abatement, removal, remediation, transporting, or disposal of a Hazardous Material, or any assessments or consulting relating to same. Limits of liability for Pollution Liability insurance shall be as follows:

Each Occurrence	\$5,000,000
Aggregate	\$5,000,000
4. General Provisions.
 - 4.1. Every policy must be written by an insurance company licensed in the state where work is being done and is reasonably acceptable to Barton Malow Company and Owner.
 - 4.2. Limits for Employer's Liability, Commercial General Liability and Automobile Liability may be attained by a combination of an underlying policy with an umbrella or excess liability policy.
 - 4.3. "Barton Malow Company," Owner, and all other entities as required in the Contract Documents shall be endorsed as additional insureds on Contractor's liability insurance (including general liability, excess liability, automobile liability and pollution liability, where applicable) with respect to liability arising out of activities performed by

or on behalf of Contractor, including Barton Malow Company's general supervision of Contractor, products and completed operations of Contractor, and automobiles owned, leased, hired or borrowed by Contractor. The coverage provided by the additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc.'s Additional Insured, Form B CG 20 10 11 85 or CG 20 26 11 85. Forms that do not provide additional insured status for completed operations will not be accepted.

4.4. Contractor will furnish, before any work is started, certificates of insurance showing the required coverages. Receipt by Barton Malow Company of a non-conforming certificate of insurance without objection, or Barton Malow Company's failure to collect a certificate of insurance, shall not waive or alter Contractor's duty to comply with the insurance requirements. Modifications to these insurance requirements will not be effective unless made in a writing executed by an authorized representative of Barton Malow Company. Upon written request by Barton Malow Company, Contractor will provide copies of its insurance policies.

4.5. Evidence of the required insurance is to be provided to Barton Malow Company on ACORD Certificate Form 25-S and must indicate:

4.5.1. Any coverage exclusions or deviations from the 1988 ISO commercial general liability form or subsequent versions;

4.5.2. A Best's rating for each insurance carrier at A minus VII or better;

4.5.3. That the issuing insurance company will provide thirty (30) days written notice of cancellation to the certificate holder and the words "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" do not apply or have been removed;

4.5.4. That additional insured endorsements have been provided as required under the Contract Documents; and

4.5.5. Any deductibles over \$10,000 applicable to any coverage.

4.6. All coverage must be primary and not excess over or contributory with any other valid, applicable, and collectible insurance in force for Barton Malow Company, Owner, or other additional insureds.

4.7. Contractor will provide full coverage for all of Contractor's equipment, property and tools used in the Work.

4.8. Contractor shall waive, and shall require (by endorsement or otherwise) its insurers providing the coverage required by these insurance requirements to waive, subrogation rights against Barton Malow Company, Owner, and all other additional insureds for losses and damages incurred and/or paid under the insurance policies required by these insurance requirements or other insurance applicable to Contractor or its Subordinate Parties, and will include this same requirement in contracts with its Subordinate Parties. If the policies of insurance referred to in this paragraph require an endorsement to provide for continued coverage where there is a waiver of subrogation, the owners of such policies will cause them to be so endorsed.

4.9. Contractor will send or fax a copy of these insurance requirements to its agent when an insurance certificate is requested to assure that the policies comply with the insurance requirements.

4.10. If Contractor requires its Subordinate Parties to provide additional insured endorsements in favor of Contractor, those endorsements shall be extended to Barton Malow Company, Owner and all other required additional insureds.

4.11. Contractor's duty to provide the insurance coverage set forth in these insurance requirements is a severable obligation from Contractor's indemnification obligations under the Contract Documents. Nothing in these insurance requirements shall be deemed to limit Contractor's liability under the Agreement.

4.12. If these insurance requirements are used in conjunction with a Project where an Affiliated Company of Barton Malow Company is acting as Construction Manager, Design Builder or otherwise (the "Construction Entity"), the term "Barton Malow Company" as used in these insurance requirements shall be deemed to be replaced with the name of the Construction Entity, and the additional insured requirements of Section 4.3 above shall be amended to include "Barton Malow Company", and all partners and/or members of the Construction Entity as applicable. "Affiliated Company" means any entity in which Barton Malow Company has an ownership interest.

**SECTION 00700
GENERAL CONDITIONS OF THE CONTRACT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to the requirements described in Section 00800 Supplementary General Conditions and Section 00500 Agreement Form.

1.02 GENERAL CONDITIONS OF THE CONTRACT

- A. Document **AIA 201/CMA 1992** Edition, is bound within this Project Manual and is a part of the Contract Documents

END OF SECTION 00700

General Conditions of the Contract for Construction

Where the Construction Manager is NOT a Constructor

1992 Construction Manager-Adviser Edition

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS MODIFICATION. AUTHENTICATION OF THIS ELECTRONICALLY DRAFTED AIA DOCUMENT MAY BE MADE BY USING AIA DOCUMENT D401.

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of the Contract, the portions of the Project Manual defined as Contract Documents therein, and 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 Notice to Proceed ~~Construction Change Directive~~ or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements).

In the event of any conflict among the Contract Documents, the Contract Documents shall be construed according to the following priorities:

Highest Priority: Modifications including Change Orders and Notice to Proceeds;

2nd Priority: Owner/Contractor Agreement;

3rd Priority: Addenda, later date to take precedence;

4th Priority: The Contract Documents (other than those mentioned above) that are included in the Project Manual sections 0 - 2000;

5th Priority: Drawings and Technical Specifications.

In the event of a conflict among the General Conditions and Supplementary Conditions, the Supplementary Conditions shall control.

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 Architect

and Contractor, (2) between the Construction Manager and Contractor, (3) between the Architect and Construction Manager, (4) between the Owner and a Subcontractor or Sub-subcontractor or (5) 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.

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 including persons or entities under separate contracts not administered by the Construction Manager.

1.1.5 THE DRAWINGS

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

1.1.6 THE SPECIFICATIONS

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

1.1.7 THE PROJECT MANUAL

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

1.1.8 Provide. When the word "provide," including derivatives, is used, it shall mean to fabricate properly, complete, transport, deliver, install, erect, construct, test, and furnish all labor, materials, equipment, apparatus, appurtenances, and all other items necessary to properly

complete in place, ready for operation or use under the terms of the Specifications.

1.1.9 Addenda. Addenda are written or graphic instruments issued prior to the execution of the Contract that modify or interpret the Bidding Documents, including the Drawings and Specifications, by additions, deletions, clarifications, or corrections.

1.1.10 Knowledge. The terms "knowledge," "recognize," and "discover," their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents. Analogously, the expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor exercising the care, skill and diligence required of the Contractor by the Contract Documents.

1.1.11 Persistently. The phrase "persistently fails" and other similar expressions, as used in reference to the Contractor, shall mean any combination of acts and omissions that cause the Owner, Construction Manager, or Architect to reasonably conclude that the Contractor will not complete the Work within the Contract Time, for the Contract Sum, or in substantial compliance with the requirements of the Contract Documents.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed, in not less than triplicate, by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

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

1.2.3 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 intended results.~~ In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and the applicable standards, codes, and ordinances, the

Contractor shall (1) provide the better quality or greater quantity of Work, or (2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation. The terms and conditions of this Subparagraph 1.2.3, however, shall not relieve the Contractor of any of the obligations set forth in Paragraphs 3.2 and 3.7.

1.2.3.1 On the Drawings, given dimensions shall take precedence over scaled measurements, and large-scale drawings over small scale drawings.

1.2.3.2 Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the Project site and shall be responsible for the correctness of such measurements. No extra charges or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Construction Manager and Architect for resolution before proceeding with the Work.

1.2.3.3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure to the Construction Manager for approval by the Architect before making the change.

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

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

1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. All

copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

1.4 CAPITALIZATION

1.4.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents published by the American Institute of Architects.

1.5 INTERPRETATION

1.5.1 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.

ARTICLE 2 OWNER

2.1 DEFINITION

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 term "Owner" means the Owner or the Owner's authorized representative.

~~2.1.2 The Owner upon reasonable written request shall furnish to the Contractor in writing information which is 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 at the time of execution of the Agreement and, within five days after any change, information of such change in title, recorded or~~

~~unrecorded.~~

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner shall, at the request of the Contractor, prior to execution of the Agreement and promptly from time to time thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. ~~(Note: Unless such reasonable evidence were furnished on request prior to the execution of the Agreement, the prospective contractor would not be required to execute the Agreement or to commence the Work.)~~

2.2.2 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. Information will be furnished only to the extent it is readily available to the Owner.

2.2.3 Except as provided in Subparagraph 3.7.1, or elsewhere in the Construction Documents for permits and fees which are the responsibility of the Contractor under the Contract Documents, 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, through the Construction Manager, shall secure and pay for the building permit. Refer to Project Manual Section 00880 Regulatory Requirements and Section 00890 Permits which detail Contractor's obligations in relation to permits.

2.2.4 Information or services under the Owner's control shall be furnished by the Owner, upon request, with reasonable promptness to avoid delay in orderly progress of the Work.

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

2.2.6 The Owner shall forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect.

2.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Other Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

the Contract Documents, at law, or in equity.

2.3 OWNER'S / CONSTRUCTION MANAGER'S RIGHT TO STOP THE WORK

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner ~~or Construction Manager, by written order signed personally or by an agent specifically so empowered by the Owner in writing,~~ may order 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 ~~or Construction Manager~~ to stop the Work shall not give rise to a duty on the part of the Owner ~~or the Construction Manager~~ to exercise this right for the benefit of the Contractor or any other person or entity.

2.4 OWNER'S / CONSTRUCTION MANAGER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seventy-two (72) hour period (or such lesser period as determined by Owner or Construction Manager in its discretion when grounds exist to complete the neglected or defaulted Work in a shorter time period) ~~seven-day period~~ after receipt of written notice from the Owner ~~or Construction Manager~~ to commence and continue correction of such default or neglect with diligence and promptness, ~~the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a second seven-day period. If the Contractor within such second seven-day period after receipt of such second notice fails to commence and continue to correct any deficiencies,~~ the Owner ~~or Construction Manager~~ may, without prejudice to other remedies the Owner ~~or Construction Manager~~ may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Construction Manager's and Architect's and their respective consultants' additional services and expenses made necessary by such default, neglect or failure. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner through the Construction Manager.~~

2.5 The rights of the Owner and Construction Manager stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner or Construction Manager granted in

ARTICLE 3 CONTRACTOR

3.1 DEFINITION

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout this Agreement as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

3.1.2 The plural term "Contractors" refers to persons or entities who perform construction under Conditions of the Contract that are administered by the Construction Manager, and that are identical or substantially similar to these Conditions.

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner pursuant to Subparagraph 2.2.2 and shall at once report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner, Construction Manager or Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor, any member of its organization, or any of its Subcontractors, recognized such error, inconsistency or omission and knowingly failed to report it to the Construction Manager and Architect before proceeding with the Work. If the Contractor performs any construction activity knowing it involves an recognized error, inconsistency or omission in the Contract Documents without such notice to the Construction Manager and Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction. correct such errors, inconsistencies, or omissions at no additional cost to the Owner.

3.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Manager and Architect at once. Refer to Project Manual Section 01530 - Field Engineering and Layout, which details Contractor's responsibilities for field layout and verification.

3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Paragraph 3.12.

3.2.4 Except as to any reported errors, inconsistencies, or omissions, and to concealed or unknown conditions defined in Subparagraph 4.7.6, by executing the Agreement, the Contractor represents the following:

3.2.4.1 The Contract Documents are sufficiently complete and detailed for the Contractor to: (1) perform the Work required to produce the results intended by the Contract Documents; and (2) comply with all the requirements of the Contract Documents.

3.2.4.2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedures, and techniques necessary to perform the Work, use of materials, selection of equipment, and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to the Work; and (3) requirements of any warranties applicable to the Work.

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 this Contract, subject to overall coordination of the Construction Manager as provided in Subparagraphs 4.6.3 and 4.6.4. The Contractor shall ensure that product suppliers, Subcontractors, and their agents and employees, perform their Work in accordance with the Contract Documents and that all products are ordered and delivered in strict accordance with the schedule. The Contractor shall coordinate its Work with that of all persons or entities on the Project site. The Contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation. A general example is equipment above corridor ceilings where ductwork, piping, conduit, lights, etc. will be installed. A thorough coordinated plan shall be used to install the equipment, to furnish proper clearances, radii of turns, locations, pipe slopes, supporting appurtenances, and access where required. Refer to Project Manual 001530 - Field Engineering and Layout.

3.3.2 The Contractor shall be fully responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, Suppliers and their agents and employees, and any entity or other persons performing portions of the Work at any tier, directly or indirectly, under a contract with the Contractor. The Contractor shall coordinate the Work of its Subcontractors engaged in construction at the Project. Whenever interference might occur, before any Work is done at the places in question, Contractor shall consult with others and shall come to agreement with them as to the exact location and level of piping, conduits, ducts and/or other Work which might cause interference. Refer to Project Manual 001530 - Field Engineering and Layout.

3.3.3 The Contractor shall not be relieved of 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 other than the Contractor.

3.3.4 The Contractor shall inspect portions of the Project related to the Contractor's Work in order to determine that such portions are in proper condition to receive subsequent Work.

3.3.5 The Contractor shall be responsible for its own, its employees' and its Subcontractors' workmanship and quality of materials and every part thereof or in connection therewith against risk of any and every kind (except those covered by a Builder's Risk Policy applicable to the Project) until the final acceptance of the Work by Owner.

3.3.6 Within fifteen (15) days of award of contract, each awarded Contractor shall assemble all necessary information and data concerning its supervision and construction procedures, as identified in Project Manual Section 00200 - Instructions to Bidders. Contractor shall submit updated information from the post-bid meetings as well as the following:

3.3.6.1 A schedule of values in the format and detail as the Construction Manager may require.

3.3.6.2 Contractor's Project Safety Program.

3.3.6.3 A complete list of all items, products and layouts for which shop drawings, brochures or samples are required; a list of each Subcontractor or supplier; the date of planned submission and time period for fabrication and delivery to the jobsite after approval of the submission. The foregoing items will be provided on forms furnished by the Construction Manager. The Contractor shall thoroughly review the

Project Manual and adhere to any additional instructions with regard to Submittals.

3.4 LABOR AND MATERIALS

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

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

3.4.3 If any person employed by or under the Contractor is found in the judgment of the Construction Manager or Owner to be incompetent, disorderly, unfaithful, disobedient so far as to endanger proper fulfillment of the Contract or otherwise objectionable, such person shall, if directed by the Construction Manager, be discharged immediately and not employed again on any part of the Work without any liability to Owner or Construction Manager for such discharge.

3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner, Construction Manager and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, ~~may~~ shall be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under 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. This warranty is not limited by the provisions of Paragraph 12.2.

3.5.2 ALL WRITTEN WARRANTIES REQUIRED BY THE CONTRACT DOCUMENTS SHALL INCLUDE LABOR AND MATERIALS AND SHALL BE SIGNED BY THE MANUFACTURER OR SUBCONTRACTOR RESPECTIVELY, AND COUNTERSIGNED BY THE CONTRACTOR. ALL WARRANTIES SHALL BE ADDRESSED TO THE OWNER AND DELIVERED TO

THE ARCHITECT THROUGH THE CONSTRUCTION MANAGER UPON COMPLETION OF THE PROJECT AND BEFORE OR WITH THE SUBMISSION OF REQUEST FOR FINAL PAYMENT.

3.5.3 The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties.

3.6 TAXES

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

3.7 PERMITS, FEES AND NOTICES

~~3.7.1 Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit and the Contractor shall secure and pay for all other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded. Refer to Project Manual Section 00880-Regulatory Requirements and Project Manual Section 00890-Permits for a description of Contractor's obligations in relation to Permits.~~

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules and regulations and lawful orders, and all other requirements of public authorities bearing on performance of the Work. The Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary backup material, and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street closing, parking meter removal, and other similar matters as may be necessary or appropriate from time to time for the performance of the Work.

3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Construction Manager,

Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations ~~without such notice to the Construction Manager, Architect and Owner~~, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

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 against which the Contractor makes reasonable objection.

3.8.2 Unless otherwise provided in the Contract Documents:

- .1 materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;
- .2 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .3 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 and not in the allowances;
- .4 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 Clause 3.8.2.2 and (2) changes in Contractor's costs under Clause 3.8.2.3.~~

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. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor's superintendent and assistants shall be satisfactory to the Construction Manager and the Owner. The Contractor's superintendent shall not be replaced except with the prior consent of the Construction Manager and Owner, unless the superintendent ceases to be in the Contractor's

employ. The Contractor shall maintain order and discipline among all workers involved in the Project at all times. The superintendent shall be present at the Project site at all times when Work is performed by the Contractor or its Subcontractors.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

3.10.1 The Contractor, promptly, ~~and within the time set forth in Project Manual Section 00230 - Schedule and Phasing~~, after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's Construction Schedule for the Work. Such schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project construction schedule ~~to the extent required by the Contract Documents~~, and shall provide for expeditious and practicable execution of the Work. Refer to Project Manual Section 00230 - Schedule and Phasing.

3.10.2 The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other Contractors or the construction or operations of the Owner's own forces. Refer to Project Manual Section 00230 - Schedule and Phasing.

3.10.3 The Contractor shall prepare and keep current, for the Construction Manager's and Architect's approval, a schedule of submittals which is coordinated with the Contractor's Construction Schedule and allows the Construction Manager and Architect reasonable time to review submittals. Refer to Project Manual 01330 - Submittals.

3.10.4 The Contractor shall conform to the most recent schedules.

3.10.5 In the event the Construction Manager or Owner determines that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Construction Manager shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime; (2) supplying additional manpower, equipment, and facilities; and (3) other similar measures (referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Construction Manager or Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance

with the schedule. Failure to order Extraordinary Measures shall not excuse late completion.

3.10.5.1 The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Construction Manager or Owner under or pursuant to this Subparagraph 3.10.5.

3.10.5.2 The Construction Manager or Owner may exercise the rights furnished the Owner under or pursuant to this Subparagraph 3.10.5 as frequently as the Construction Manager or Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

3.10.6 The Construction Manager or Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operations of other contractors or of the Owner's premises or any of the Owner's tenants or invitees. The Contractor shall, upon the Construction Manager's or Owner's request, schedule any portion of the Work affecting other contractors or other operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling, or performance of the Work under this Subparagraph 3.10.6 may be grounds for an extension of the Contract Time, if permitted under Paragraph 8.3, and an equitable adjustment in the Contract Sum if (1) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, and (2) such rescheduling or postponement is required for the convenience of the Owner.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Construction Manager and Architect and shall be delivered to the Construction Manager for submittal to the Owner upon completion of the Work. The Contractor shall advise the Construction Manager on a current basis of all changes in the Work made during construction. Refer to Project Manual Section 01320 - Communications, Section 01700 - Contract Close Out, and Section 01720 - Project Record Documents.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

3.12.3 Samples are physical examples which 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. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Subparagraph 4.6.12.

3.12.5 Within seven (7) days after award of Contract, the Contractor shall submit to Construction Manager a submittal register as set forth in Project Manual Section 01330 - Submittals. The Contractor shall review, approve and submit to the Construction Manager, in accordance with the schedule and sequence approved by the Construction Manager, and in a manner calculated to cause no delay in Contractor's Work or the Work of Owner or other Contractor. Shop Drawings, Product Data, Samples, brochures and similar submittals required by the Contract Documents. 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. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Construction Manager and Architect. Such Work shall be in accordance with approved submittals.

3.12.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

3.12.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents

by the Construction Manager's and Architect's review or approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and the Construction Manager and Architect have given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Construction Manager's and 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.

3.12.10 Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents.

3.12.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Construction Manager and Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications. Refer to Project Manual Section 01330 - Submittals and Architect's technical specifications for specific instructions regarding Contractor's submittal requirements.

3.13 USE OF SITE

3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

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.

3.13.3 Only materials and equipment that are to be used directly in the Work shall be brought and stored on the Project Site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the Contractor's responsibility.

3.13.4 The Contractor and any entity the Contractor is responsible for shall not erect any sign on the Project site without the Owner's prior written consent, which may be withheld in the Owner's sole discretion.

3.13.5 The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment. Without limitation of any other provision of the Contract Documents, the Contractor shall minimize any interference with the occupancy or beneficial use of any areas in buildings adjacent to the site of the Work or the premises in the event of partial occupancy, as more specifically described in Paragraph 9.9.

3.13.6 The Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site, as amended from time to time. The Contractor shall immediately notify the Construction Manager and Owner in writing if during the performance of the Work the Contractor finds compliance with any portion of such rules and regulations to be impracticable. The Contractor's notice shall set forth the specific issues with such compliance and suggest alternatives under which the same results intended by the rules and regulations may be achieved. The Owner may in such a circumstance, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site. Refer to Project Manual Section 01140 - Use of Premises for a complete description of Contractor's obligations regarding use 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.

3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Contractors by cutting, patching, excavating or otherwise altering such construction. The Contractor shall not cut or otherwise alter such construction by other Contractors or by the Owner's own forces except with written consent of the Construction Manager, Owner and such other Contractors; such consent shall not be unreasonably withheld. The Contractor shall not

unreasonably withhold from the other Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

3.14.3 See technical specifications for further requirements.

13.5 CLEANING UP

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

13.5.2 If the Contractor fails to clean up as provided in the Contract Documents, the Construction Manager may do so with the Owner's approval and the cost thereof shall be charged to the Contractor. Refer to Project Manual Section 01550 - Cleaning Up and Final Cleaning.

3.16 ACCESS TO WORK

3.16.1 The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

3.17 ROYALTIES AND PATENTS

3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect and Construction Manager.

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) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for~~

~~whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.~~

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect and Construction Manager, and their respective agents, representatives, employees, officers, affiliates, and successors (collectively, "Indemnitees") from and against any and all claims, demands, liabilities, causes of action, costs, and expenses, including reasonable attorney fees and litigation expenses (collectively "Indemnification Claims"), involving:

- (a) personal injury or death of any person;
- (b) property damage (including loss of use);
- (c) the breach of any provision in the Owner-Contractor Agreement;
- (d) money claims by subcontractors, suppliers or any entity involved in the Work at any tier;
- (e) any contractual duty of an Indemnitee to indemnify another person; or
- (f) the enforcement by an Indemnitee of its rights under this provision;

but only if such Indemnification Claims arise from or relate directly or indirectly to the Work under the Contract by, or the acts or omissions of: (i) the Contractor; (ii) its subcontractors, vendors or suppliers at any tier, or (iii) any persons for whom any of them are responsible, including their employees, agents, officers, or representatives. In any event, the obligations contained in Subparagraph 3.18.1 shall not apply to an Indemnification Claim resulting from the sole negligence of an Indemnitee.

3.18.2 In claims against any person or entity indemnified under this Paragraph 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 this Paragraph 3.18 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.

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Construction Manager, Architect, ~~their~~ its consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, ~~or~~ (2) ~~the giving of or the failure to give directions or instructions by the Construction Manager, Architect, their consultants, and agents~~

~~and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.~~

3.18.4 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 or Construction Manager is named as a party, the Contractor shall immediately advise the Owner and Construction Manager, in writing, of such claim or lawsuit, and shall provide a full and complete copy of any documents or pleadings relating thereto, as well as a full and accurate report of the facts involved.

3.18.5 An Indemnatee, at its option, may select counsel to defend any claim, cause of action or lawsuit brought against it without impairing any obligation of Contractor to provide indemnification.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

4.2 CONSTRUCTION MANAGER

4.2.1 The Construction Manager 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 term "Construction Manager" means the Construction Manager or the Construction Manager's authorized representative.

4.2.1.1 The Construction Manager shall act as the Owner's agent for purposes of administering and enforcing the Contract.

4.3 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. Consent shall not be unreasonably withheld.

4.4 In case of termination of employment of the Construction Manager or Architect, the Owner shall appoint a construction manager or architect against whom the Contractor makes no reasonable objection and whose status under the Contract Documents shall be that of the former construction manager or architect, respectively.

4.5 Disputes arising under Paragraphs 4.3 and 4.4 shall be subject to arbitration.

4.6 ADMINISTRATION OF THE CONTRACT

4.6.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents, and will be the Owner's representatives (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the correction period described in Paragraph 12.2. All instructions to the Contractor shall be forwarded through the Construction Manager. The Construction Manager and Architect will advise and consult with the Owner and will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.6.2 The Construction Manager will determine in general that the Work is being performed in accordance with the requirements of the Contract Documents, will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

4.6.3 The Construction Manager will provide for coordination of the activities of other Contractors and of the Owner's own forces with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other Contractors and the Construction Manager and Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule as set forth in Paragraph 3.10, deemed necessary after a joint review and mutual agreement. ~~The construction schedules shall constitute the schedules to be used by the Contractor, other Contractors, the Construction Manager and the Owner until subsequently revised.~~

4.6.4 The Construction Manager will schedule and coordinate the activities of the Contractors in accordance with the latest approved Project construction schedule.

4.6.5 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work. On the basis of on-site observations as an architect, the Architect will keep the Owner informed of progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

4.6.6 The Construction Manager, ~~except to the extent required by Subparagraph 4.6.4,~~ and Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or

procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3, and neither will be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. Neither the Construction Manager nor the Architect 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 performing portions of the Work.

4.6.6.1 The Architect, the Owner and the Construction Manager shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so that the Architect and the Construction Manager may perform their functions under the Contract Documents.

4.6.7 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall communicate through the Construction Manager, and shall contemporaneously provide the same communications to the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect.

4.6.8 The Construction Manager will review and certify all Applications for Payment by the Contractor, including final payment. The Construction Manager will assemble each of the Contractor's Applications for Payment with similar Applications from other Contractors into a Project Application and Project Certificate for Payment. After reviewing and certifying the amounts due the Contractors, the Construction Manager will submit the Project Application and Project Certificate for Payment, along with the applicable Contractors' Applications and Certificates for Payment, to the Architect.

4.6.9 Based on the Architect's observations and evaluations of Contractors' Applications for Payment, and the certifications of the Construction Manager, the Architect will review and certify the amounts due the Contractors and will issue a Project Certificate for Payment.

4.6.10 The Architect will have authority to reject Work which does not conform to the Contract Documents, and to require additional inspection or testing, in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed, but will take such action only after notifying the Construction Manager. Subject to review by the Architect, the Construction Manager will have the authority to reject Work which does not conform to the Contract Documents. Whenever the Construction Manager considers it necessary or advisable for implementation of the intent of the Contract Documents, the Construction Manager

will have authority to require additional inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Subparagraphs 4.6.18 through 4.6.20 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 Subparagraph 4.6.10 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, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

4.6.11 The Construction Manager will receive from the Contractor and review and approve all Shop Drawings, Product Data and Samples, coordinate them with information contained in related documents received from other Contractors, and transmit to the Architect those recommended for approval. The Construction Manager's actions will be taken with such reasonable promptness as to cause no delay in the Work of the Contractor or in the activities of other Contractors, the Owner, or the Architect.

4.6.12 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 with such reasonable promptness as to cause no delay in the Work of the Contractor or in the activities of the other Contractors, the Owner, or the Construction Manager, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.6.13 The Construction Manager will prepare Change Orders and Notices to Proceed Construction Change Directives.

4.6.14 Following consultation with the Construction Manager, the Architect will take appropriate action on Change Orders or Notice to Proceed Construction Change Directives in accordance with Article 7 and will have authority to order minor changes in the Work as provided in Paragraph 7.4.

4.6.15 The Construction Manager will maintain at the site for the Owner one record copy of all Contracts, Drawings, Specifications, addenda, Change Orders and other Modifications, in good order and marked currently to record all changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

4.6.16 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and final completion, and will receive and forward to the Architect written warranties and related documents required by the Contract and assembled by the Contractor. The Construction Manager will forward to the Architect a final Project Application and Project Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.6.17 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

4.6.18 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. Any such requests by the Contractor shall be submitted through the Construction Manager. The Architect's response to such requests will be made with reasonable promptness and within any time limits agreed upon. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.6, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

4.6.19 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, 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.

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

4.7 CLAIMS AND DISPUTES

4.7.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or

interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.7.2 Decision of Architect. Claims, including those alleging an error or omission by the Construction Manager or Architect, shall be referred initially to the Architect through the Construction Manager for action as provided in Paragraph 4.8. A decision by the Architect, after consultation with the Construction Manager, as provided in Subparagraph 4.8.4, shall be required as a condition precedent to arbitration or litigation of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due, regardless of (1) whether such matters relate to execution and progress of the Work or (2) the extent to which the Work has been completed. The decision by the Architect in response to a Claim shall not be a condition precedent to arbitration or litigation in the event (1) the position of Architect is vacant, (2) the Architect has not received evidence or has failed to render a decision within agreed time limits, (3) the Architect has failed to take action required under Subparagraph 4.8.4 within 30 days after the Claim is made, (4) 45 days have passed after the Claim has been referred to the Architect or (5) the Claim relates to a mechanic's lien.

4.7.3 Time Limits on Claims. Claims by either ~~party~~ Contractor must be made 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, provided, however, that the Contractor shall use its best efforts to furnish the Construction Manager, Architect, and the Owner, as expeditiously as possible, with notice of any Claim, including, without limitation, those in connection with concealed or unknown conditions, as soon as such Claim is recognized. Contractor shall cooperate with the Construction Manager, Architect, and the Owner in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of the Claim. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

4.7.4 Continuing Contract Performance. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.7.5 Waiver of Claims: Final Payment. 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; or
- .3 ~~terms of special warranties~~ required by the Contract Documents.

4.7.6 Claims for Concealed or Unknown Conditions.

If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines after consultation with the Construction Manager 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 so notify the Owner and Contractor through the Construction Manager in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.8. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's prior inspections, tests, reviews, and preconstruction services for the Project, or inspections, tests, reviews, and preconstruction services that the Contractor had the opportunity to make or should have performed in connection with the Project in the exercise of the care and skill required of the Contractor by the Contract Documents.

4.7.7 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes

additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with the procedure established herein.

4.7.8 Claims for Additional Time.

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

4.7.8.2 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 and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction.

4.7.9 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraphs 4.7.7 or 4.7.8.

4.8 RESOLUTION OF CLAIMS AND DISPUTES

4.8.1 The Architect will review with the Construction Manager Claims and take one or more of the following preliminary actions within ten days of its receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Architect expects to take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.8.2 If a Claim has been resolved, the Architect will prepare or obtain appropriate documentation.

4.8.3 If a Claim has not been resolved, the party making the Claim shall, within ten days after the Architect's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Architect, (2) modify the initial Claim or (3) notify the Architect that the initial Claim stands.

4.8.4 If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven days, which decision shall be final and binding on the parties but subject to arbitration. Upon expiration of such time period, the Architect will render to the parties the Architect's written decision relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect Construction Manager may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.9 ARBITRATION

4.9.1 Controversies and Claims Subject to Arbitration. Unless otherwise provided in the Agreement between Owner and Contractor or in the Supplementary Conditions. Any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof, except controversies or Claims relating to aesthetic effect and except those waived as provided for in Subparagraph 4.7.5. Such controversies or Claims upon which the Architect has given notice and rendered a decision as provided in Subparagraph 4.8.4 shall be subject to arbitration upon written demand of either party. Arbitration may be commenced when 45 days have passed after a Claim has been referred to the Architect as provided in Paragraph 4.7 and no decision has been rendered.

4.9.2 Rules and Notices for Arbitration. Claims between the Owner and Contractor not resolved under Paragraph 4.8 shall, if subject to arbitration under Subparagraph 4.9.1, be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect, unless the parties mutually agree otherwise. Notice of demand for arbitration shall be filed in writing with the other party to the Agreement between the Owner and Contractor and with the American Arbitration Association, and copies shall be filed with the Construction Manager and Architect.

4.9.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall comply with Subparagraph 4.7.4.

4.9.4 When Arbitration May Be Demanded. Demand for arbitration of any Claim may not be made until the earlier of (1) the date on which the Architect has rendered a final written decision on the Claim, (2) the tenth day after the parties have presented evidence to the Architect or have been given reasonable opportunity to do so, if the Architect has not rendered a final written decision by that date, or (3) any of the five events described in Subparagraph 4.7.2.

4.9.4.1 When a written decision of the Architect states that (1) the decision is final but subject to arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

4.9.4.2 A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.9.1 and 4.9.4 and Clause 4.9.4.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

4.9.5 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation or joinder or in any other manner, the Construction Manager, the Architect, or the Construction Manager's or Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Construction Manager, Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, other Contractors as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No persons or entities other than the Owner, Contractor or other Contractors as defined in Subparagraph 3.1.2 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a dispute not described therein or with a person or entity not named or described therein. 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.

4.9.6 Claims and Timely Assertion of Claims. A party who files 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. When a party fails to include a Claim through oversight, inadvertence or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

4.9.7 Judgment on Final Award. 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.

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 subcontractors of other Contractors.

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 ~~Within seven (7) days after award of the Contract, the Contractor shall submit in writing to the Construction Manager, for review by the Owner, Architect and Construction Manager, (1) the name, trade, and subcontract amount for each Subcontractor and (2) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager will promptly reply to the Contractor in writing stating whether or not the Owner, Construction Manager or Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Construction Manager to reply promptly shall constitute notice of no reasonable objection.~~

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, 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. ~~The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. The Contract Sum shall be amended by either of the following at the Owner's sole discretion: (1) the difference between the subcontract amount proposed by the person or entity recommended by the Contractor and the subcontract amount proposed by the person or entity accepted or designated by the Owner and the Construction Manager; or (2) the amount by which the subcontract amount proposed by the person or entity accepted or designated by the Owner and Construction Manager exceeds the amount set forth in the Schedule of Values that is applicable to the Work covered by such subcontract.~~ However, no increase in the Contract Sum 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 change a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such change.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate written agreement, ~~written where legally required for validity~~, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these 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 which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.3.2 All subcontracts shall be in writing and shall specifically provide that the Owner is an intended third-party beneficiary of such subcontracts.

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 Paragraph 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

5.4.2 If the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted. If the Work in connection with a subcontract has been suspended for more than thirty (30) days after termination of the Contract by the Owner pursuant to Paragraph 14.2 or Paragraph 14.4 and the Owner accepts assignment of such subcontract, the Subcontractor's compensation shall be equitably adjusted for any increase in direct costs necessarily incurred by such subcontractor as a result of the suspension. In no event will such an adjustment include extended home office overhead or lost profit.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER 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, which may include persons or entities under separate contracts not administered by the Construction Manager. The Owner further reserves the right to award other contracts in connection with other portions of the Project or other construction or operations on the site ~~under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.~~ If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.

6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner or the Construction Manager shall

provide for coordination of such forces 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, the Owner shall be deemed to be ~~subject to the same obligations and to~~ have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in this Article 6 and in Articles 3, 10, 11 and 12, as amended.

6.2 MUTUAL RESPONSIBILITY

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

6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed construction or partially completed construction or to property of the Owner or other Contractors as provided in Subparagraph 10.2.5. Should a claim be made that the Contractor wrongfully delayed or caused damage to the Work or property of another contractor, the Contractor shall promptly settle the dispute with such other contractor. If a separate contractor sues or initiates an arbitration proceeding against the Construction Manager or 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 Construction Manager or Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Construction Manager or Owner for all costs, including attorney's fees and court or arbitration costs which either may have incurred.

6.2.5 Claims and other disputes and matters in question between the Contractor and other Contractors shall be subject to the provisions of Paragraph 4.7 provided the other Contractors have reciprocal obligations.

6.2.6 The Owner and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

6.3 OWNER'S OR CONSTRUCTION MANAGER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises among the Contractor, other Contractors and the Construction Manager and/or the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner or Construction Manager may clean up and allocate the cost among those responsible as the Construction Manager, in consultation with the Architect, determines to be just. Refer to Project Manual Section 01550 - Clean Up and Final Cleaning.

ARTICLE 7 CHANGES IN THE WORK

7.1 CHANGES

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, ~~Construction Change Directive~~ Notice to Proceed, or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. Refer to Project Manual Section 01250 - Changes in the Work.

7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a ~~Construction Change Directive~~ Notice to Proceed 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, and Contractor shall proceed promptly, unless otherwise provided in the Change Order, ~~Construction Change Directive~~ Notice to Proceed, or order for a minor change in the Work. Except as permitted in Paragraph 7.3, an increase in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust

enrichment to the Work, shall be the basis of any claim for an increase in any amounts due under the Contract Documents or for a change in any time period provided for in the Contract Documents.

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or ~~Notice to Proceed~~ Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

7.2 CHANGE ORDERS

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

7.2.2 Methods used in determining adjustments to the Contract Sum ~~may include~~ shall be those listed in Subparagraph 7.3.3.

7.2.3 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change, any impact such change may have on the unchanged Work, including but not limited to claims for acceleration, stacking, inefficiency, ripple effect, disruption, compression, interference, delay and cumulative impact, and any and all adjustments to the Contract Sum and the Schedule. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents.

7.3 CONSTRUCTION CHANGE DIRECTIVES NOTICE TO PROCEED and QUOTATION ONLY

7.3.1 A ~~Construction Change Directive~~ Notice to Proceed is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by ~~Construction Change~~

~~Directive~~Notice to Proceed, 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. A Quotation Only has the meaning set forth in Project Manual Section 01250 - Changes in the Work.

7.3.2 A Construction Change Directive~~Notice to Proceed~~ shall be used in the absence of total agreement on the terms of a Change Order or when time constraints preclude getting a Change Order issued.

7.3.3 If the Construction Change Directive~~Notice to Proceed~~ 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; or
- .3 actual cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee as set forth in Project Manual section 01250 - Changes in the Work; or
- .4 as provided in Subparagraph 7.3.6.

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

7.3.5 A Construction Change Directive~~Notice to Proceed~~ signed by the Contractor indicates the agreement of the Contractor 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.

7.3.6 ~~If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Construction Manager 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, a reasonable allowance for overhead and profit. In such case, and also under Clause 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 Subparagraph 7.3.6 shall be limited to the following:~~

- ~~.1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;~~
- ~~.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 related to the Work; and~~
- ~~.5 additional costs of supervision and field office personnel directly attributable to the change.~~

7.3.7 ~~Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager. 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.~~

7.3.8 ~~If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be referred to the Construction Manager for determination.~~

7.3.9 ~~When the Owner and Contractor agree with the determination made by the Construction Manager concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately through the Construction Manager and shall be recorded by preparation and execution of an appropriate Change Order.~~

7.4 MINOR CHANGES IN THE WORK

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

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. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

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

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

8.2 PROGRESS AND COMPLETION

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

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

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 of the Work.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner's own forces, Construction Manager, Architect, any of the other Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, adverse weather conditions not reasonably anticipated, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending

~~arbitration, or by other causes which the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay is not caused, or could not have been anticipated or prevented by the Contractor, could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, and is of a duration not less than one (1) day, for such reasonable time as the Architect may determine.~~

~~8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.7. Any claim for extension of time shall be made in writing to the Construction Manager in the manner and time specified by Paragraph 4.7; otherwise it shall be waived. In the case of a continuing delay only one claim is necessary. The Contractor shall provide a written estimate of the probable effect of such delay on the progress of the Work.~~

~~8.3.3 This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted under Subparagraph 8.3.1, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution, or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity or acceleration; or (4) other similar claims (collectively referred to in this Subparagraph 8.3.3 as Delays) whether or not such Delays are foreseeable, unless a Delay is caused by the Owner's active interference with the Contractor's performance of the Work, and only to the extent such acts continue after the Contractor furnishes the Owner with notice of such interference. In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active~~

interference with the Contractor's performance of the Work.

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.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Within seven (7) days after award of contract. Contractor shall submit to the Architect, through the Construction Manager, a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's 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 for Work completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for elsewhere in the Contract Documents. See Project Manual Section 01290 - Payment Procedures for a description of Contractor's obligations in relation to Applications for Payment.

9.3.1.1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives/Notice to Proceed but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

9.3.1.3 The Contractor shall provide supporting data substantiating the Contractor's right to payment as the Owner, Architect and Construction Manager may require.

9.3.2 Payment will not be made on account of materials or equipment stored on or off site unless the

requirements set forth in Project Manual Section 01290 regarding materials stored off site are met to the satisfaction of Construction Manager. 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 applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work (including materials and equipment) 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 (hereinafter collectively referred to as "Liens") in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.3.3.1 The Contractor further expressly undertakes to defend the Indemnitees, at the Contractor's sole expense, against any actions, lawsuits, or proceedings brought against the Indemnitees as a result of Liens filed against the Work, the site of the Work, the Project site and any improvements on it, payments due the Contractor, or any portion of the property of any of the Indemnitees. The Contractor agrees to indemnify and hold the Indemnitees harmless against any such Liens and agrees to pay any judgment resulting from any such actions, lawsuits, or proceedings.

9.3.3.2 The Owner shall release any payments withheld due to a Lien if the Contractor obtains security acceptable to the Owner or a lien bond that is (1) issued to a surety acceptable to the Owner; (2) in form and substance satisfactory to the Owner; and (3) in an amount not less than one hundred fifty percent (150%) of such Lien. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Paragraph 9.3, including, without limitation, the duty to defend and indemnify the Indemnitees. The cost of any premiums incurred in connection with such bonds and security shall be the Contractor's responsibility and shall not be part of, or cause any adjustment to, the Contract Sum.

9.3.3.3 Notwithstanding the foregoing, the Owner reserves the right to settle any disputed Lien by making payment to the lien claimant or by such other means as the Owner, in the Owner's sole discretion, determines is the most economical or advantageous method of settling the dispute. The Contractor shall promptly reimburse Owner, upon demand, for any payments so made.

9.4 CERTIFICATES FOR PAYMENT

~~9.4.1 The Construction Manager will assemble a Project Application for Payment by combining the Contractor's applications with similar applications for progress payments from other Contractors and, after certifying the amounts due on such applications, forward them to the Architect within seven days. The Architect will, after the receipt of the Project Application for Payment with the recommendations of the Construction Manager, review the Project Application for Payment and either issue a Project Certificate for Payment to the Owner with a copy to the Construction Manager for such amounts as the Architect determines are properly due, or notify the Construction Manager and Owner in writing of the reasons for withholding a Certificate as provided in Subparagraph 9.5.1. Such notifications will be forwarded to the Contractor by the Construction Manager.~~

~~9.4.2 Within seven days after the Architect's receipt of the Project Application for Payment, the Construction Manager and Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Contractor, for such amount as the Construction Manager and Architect determine is properly due, or notify the Contractor and Owner in writing of the Construction Manager's and Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1. Such notification will be forwarded to the Contractor by the Construction Manager.~~

9.4.2 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will constitute representations made separately by the Construction Manager and Architect to the Owner, based on their individual observations at the site and the data comprising the Application for Payment submitted by the Contractor, that the Work has progressed to the point indicated and that, to the best of the Construction Manager's and Architect's knowledge, information and belief, quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Construction Manager or Architect. The issuance of a separate Certificate for Payment or a Project Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the

amount certified. However, the issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material 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 decide not to certify payment and may withhold a 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 Subparagraph ~~9.4.1~~ 9.4.2 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager or Architect will notify the Contractor and Owner as provided in Subparagraph ~~9.4.2~~ 9.4.1. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Construction Manager and Architect will promptly issue a Certificate for Payment for the amount for which the Construction Manager and Architect are able to make such representations to the Owner. The Construction Manager or Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a 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 because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims;
- .3 failure of the Contractor to make payments properly to Subcontractors or 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 Construction Manager or another 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 persistent failure to carry out the Work in accordance with the Contract Documents.

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

9.5.3 Should the Subcontractor be in debt to the Owner for any reason, whether in connection with this Contract or a separate contract on this, or another Project, then Owner shall have the right to apply funds from this Contract against the debt owed.

9.6 PROGRESS PAYMENTS

9.6.1 The Owner shall either forward payments for the preceding month's Work to the Contractor directly, or forward payments for the preceding month's Work to the Construction Manager for distribution to Contractors. As agent of the Owner, Construction Manager shall forward payment to Contractor following verification of Owner's disbursement checks. After the Construction Manager and Architect have issued a 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.

9.6.2 The Contractor shall promptly pay each Subcontractor, ~~upon~~ within five (5) days of receipt of payment from the Owner or Construction Manager, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such 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 similar manner.

9.6.3 The Construction Manager ~~will, on request may, on request, and in the Construction Manager's discretion,~~ 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 Neither the Owner, Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law. However, if either Owner, Construction Manager or Architect has cause for concern of whether all payments have been made or will be made as required to subcontractors, laborers or suppliers or creditors of the Subcontractor, Owner, Construction Manager or Architect, in their sole discretion, and without limiting other remedies, after seventy-two (72)

hours notice to Contractor, have the right to issue payments either by joint check, payable to both Contractor and the subcontractor, laborer, supplier or creditor, or directly to the subcontractor, laborer, supplier or creditor. Such payments shall be applied against the Contract Sum to the same extent as if the payment were made solely to the Contractor. The Owner, Construction Manager or Architect's rights to issue joint checks or direct payments shall in no event create an obligation on the part of the Owner, Construction Manager or Architect to exercise this right on behalf of a subcontractor, labor, supplier or creditor.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

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

9.7 FAILURE OF PAYMENT

9.7.1 If the Construction Manager should fail to issue recommendations within fourteen (14) days of receipt of the Contractor's Application for Payment, or if, through no fault of the Contractor, the Architect does not issue a Project Certificate for Payment within fourteen (14) days after the Architect's receipt of the Project Application for Payment, or if the Owner does not pay the Contractor within fourteen (14) days after the date established in the Contract Documents any amount certified by the Architect or awarded by arbitration, then the Contractor may, upon fourteen (14) additional days' written notice to the Owner, the Architect and the Construction Manager, stop Work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be accomplished as provided in Article 7. If, through no fault of the Contractor, 1) the Construction Manager and Architect do not issue a Project Certificate for Payment within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment or 2) 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 arbitration, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be accomplished as provided in Article 7.

9.7.2 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so 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 and Construction Manager shall jointly prepare and submit to the Architect through the Construction Manager a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. 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 in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit through the Construction Manager a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of

Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. In no case shall the Contractor's final completion of the Work and contract closeout (see Project Manual Section 01700 - Contract Closeout) exceed sixty (60) days from the date of issuance of the Certificate of Substantial Completion. In the event Contractor fails to complete the Work within the sixty (60) day period, the Owner may, in addition to all of its other rights and remedies under the Contract and at law and/or equity, complete the Contractor's Work at the sole expense of Contractor. Owner shall be entitled to deduct from the final payment all costs and expenses incurred in completing the Work, including additional Construction Management and Architecture fees and costs. In the event the costs exceed the amounts being withheld by Owner for final payment, the Contractor or its surety shall make the excess payment within five (5) days of demand by the Owner.

9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Manager and Architect, the Owner shall or Construction Manager may make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.8.3.1 Within thirty (30) days after Certificate of Substantial Completion has been issued for all portions of its Work, Contractor may be paid at the discretion of the Construction Manager and Owner, a sum sufficient to increase total payments to One Hundred Percent (100%) of Contract Sum, or portion thereof, less such retainage as Architect and Construction Manager determine in their sole discretion is necessary to protect Owner for any and all incomplete work and unsettled claims.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner reserves the right to occupy the whole or any portion of the premises at any time prior to completion of the Work provided such occupancy or use is consented to by the insurer as required under Subparagraph 11.3.11 and authorized by public authorities having jurisdiction over the Work. It is understood and agreed that the right to use the premises is part of the Contract and the Contractor has taken this possibility into account when preparing its bid, and that the Contractor shall proceed with the Work in such a manner as may be directed and shall cooperate with the Owner to limit interruptions to the Owner's routine operations. 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 as required under Subparagraph 9.9.1 and authorized by public authorities having jurisdiction over the Work.~~ 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, through the Construction Manager, as provided under Subparagraph 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.

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 written 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 will forward the notice and Application to the Architect, along with Construction Manager's recommendation, if any, who will promptly make such inspection. When the Architect, and based on the recommendation of the Construction Manager, 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 stating that to the best of ~~their~~ its knowledge, information and belief, and on the basis of ~~their~~ its observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. The ~~Construction Manager's and Architect's approval of the~~ final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees and specified closeout documents required under or pursuant to the Contract Documents shall be assembled

and delivered by the Contractor to the Construction Manager as part of the final Application for Payment (Refer to Project Manual Section 01700 - Contract Closeout, Section 01720 - Project Record Documents, Section 01730 - Operations and Maintenance Data, Section 01740 - Warranties and Guarantees, and Section 01750 - Systems Demonstration, Training and Start Up). The final Certificate for Payment will not be issued by the Architect until all warranties and guarantees and other specified closeout documentation have been received and accepted by the Owner.

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 Construction Manager or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial 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 and (5), if required by the Owner or Construction Manager, other data establishing payment or satisfaction of obligations, such as receipts, 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 or Construction Manager. If a Subcontractor refuses to furnish a release or waiver required by the Owner or Construction Manager, the Contractor may furnish a bond satisfactory to the Owner and Construction Manager to indemnify the Owner and Construction Manager against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner and/or Construction Manager all money that the Owner and/or Construction Manager may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the 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 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 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. The making of final payment shall constitute a waiver of Claims by the Owner as provided in Subparagraph 4.4.5.

9.10.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment. Such waivers shall be in addition to the waiver described in Subparagraph 4.7.5. If Contractor fails to submit a final Application for Payment or a final waiver within a reasonable time after request by Construction Manager, and in no event later than sixty (60) days after the issuance of the Certificate of Substantial Completion, the Owner and Construction Manager may unilaterally determine the balance due to the Contractor and the Contractor shall be bound by such determination.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be solely responsible to the Owner and Construction Manager 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. Contractor shall be responsible for payment of all fines levied against Owner, Architect or Construction Manager and all costs (including attorney's fees) incurred as a result of such fines arising from or relating to conduct of Contractor's Work.

10.1.2 In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (PCB), or any other hazardous material, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner, Construction Manager and Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB), or any other material deemed hazardous, and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, or polychlorinated biphenyl (PCB), or any other hazardous material, or when it has been rendered harmless, by written agreement of the Owner and Contractor, or in accordance with final determination by the Architect on which arbitration has not been demanded, or by arbitration under Article 4. The term "rendered harmless" shall be interpreted to mean

that levels of asbestos, polychlorinated biphenyls, and other hazardous materials are less than any applicable exposure standards set forth in OSHA regulations. In no event, however, shall the Owner, Construction Manager or Architect have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor, any material supplier, or any entity for whom any of them is responsible. The Contractor agrees not to use any fill or other materials to be incorporated into the Work that are hazardous, toxic, or made up of any items that are hazardous or toxic. Refer to Project Manual Section 00840 - Hazardous Materials.

10.1.3 The Contractor shall not be required pursuant to Article 7 to perform without consent any Work relating to asbestos or polychlorinated biphenyl (PCB), or any other hazardous material.

10.1.4 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, 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 is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Owner, anyone directly or indirectly employed by the Owner or anyone for whose acts the Owner may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Subparagraph 10.1.4.

10.1.5 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing. The Owner, Contractor, Construction Manager and Architect shall then proceed in the same manner described in Subparagraph 10.1.2.

10.1.6 The Owner shall be responsible for obtaining the services of a licensed laboratory to verify a 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 verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall 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 such material or substance or who are to perform the task of removal or safe containment of such 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.

10.2 SAFETY OF PERSONS AND PROPERTY

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

1. all employees involved in the Project and all other persons who may be affected thereby; employees on the Work of 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 or the Contractor's Subcontractors or Sub-subcontractors;
3. other property at the site or adjacent thereto, such as, but not limited to, 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, the Construction Manager or other Contractors.

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

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable all necessary or appropriate safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property and improvements adjacent to the Project. Any damages to such property or improvements shall be promptly repaired by the Contractor. Without limiting the indemnity provisions elsewhere in the Contract Documents, the Contractor shall indemnify and

hold harmless the Owner and Construction Manager from and against any and all actions or damages arising out of or resulting from damage to such property or improvements.

10.2.4 Use of explosives is not permitted. When use or storage of hazardous substances or equipment, or unusual construction methods are necessary, Contractor shall give Owner, Construction Manager and Architect reasonable advanced notice. When driving or removing piles, wrecking, performing excavation work or other similar potentially dangerous work, the Contractor shall provide protection and exercise utmost care, under supervision of properly qualified personnel, so as not to endanger life or property. Contractor is fully responsible for any and all damages, claims and for defense of all actions against Owner, Construction Manager and Architect resulting from prosecution of such work in connection with or arising out of the Contract. When use for storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 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 Clauses 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss 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 Paragraph 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 load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.2.8 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work, as necessary, from injury by any cause.

10.2.9 The Contractor shall promptly report by telephone and in writing to the Owner, Construction Manager and Architect all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage, giving full details and observations of any witnesses. See Project Manual Section 00810 - Safety Program.

10.3 EMERGENCIES

10.3.1 In an emergency affecting safety or persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.7 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and

.7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

.8 The Contractor's liability insurance shall include all major divisions of coverage and be on a comprehensive basis, including, without limitation:

(1) Premises/Operations (including X, C, and U coverages as applicable).

(2) Independent Contractors' Protective.

(3) Products and Completed Operations.

(4) Personal Injury Liability with Employment Exclusion deleted.

(5) Contractual, including specified provision for Contractor's obligations under Paragraph 3.18.

(6) Owned, nonowned, and hired motor vehicles.

(7) Broad Form Property Damage, including Completed Operations.

The Contractor's insurance shall meet all additional insurance requirements set forth in the Project Manual Section 00620 - Insurance.

.9 If the Contractor has design responsibility under the Contract Documents, the Contractor shall procure and maintain professional liability insurance in a form and substance that is satisfactory to the Owner. See Project Manual Section 00620 - Insurance.

.10 If the Work involves hazardous waste, hazardous material or asbestos, the Contractor shall procure and maintain pollution liability insurance in a form and substance that is satisfactory to the Owner. See Project Manual Section 00620 - Insurance.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Refer to Project Manual Section 00620 - Insurance for the specific required coverages, limits, endorsements and time periods that Contractor's insurance must be maintained.

11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief. The Contractor agrees to deliver to the Construction Manager, within ten (10) days of the date of the Owner-Contractor Agreement and prior to bringing any equipment or personnel onto the site of the Work or the Project site, certified copies of all insurance policies procured by the Contractor under or pursuant to this Paragraph 11.1 or, with consent of the Owner and Construction Manager, Certificates of Insurance in form and substance satisfactory to the Owner and Construction Manager evidencing the required coverages with limits not less than those specified in the Project Manual Section 00620 - Insurance. The coverage afforded under any insurance policy obtained under or pursuant to this Paragraph 11.1 shall be primary and not excess over or contributory with any valid and collectible insurance carried separately by any of the Indemnitees. Furthermore, all policies and Certificates of Insurance shall expressly provide that no less than thirty (30) days' prior written notice shall be given the Construction Manager, Architect, and Owner in the event of material alteration, cancellation, nonrenewal, or expiration of the coverage contained in such policy or evidenced by such certified copy or Certificate of Insurance. The Owner and Construction Manager ("Barton Malow Company") shall be named additional insureds on the General Liability, Excess Liability, Pollution Liability and Auto Coverage and the policy endorsement form must be the ISO Additional Insured - Owners, Lessees or Contractors (Form B) CG2010 11 85, CG2026 11 85 or an equivalent and must provide additional insured status during completion operations.

11.1.4 In no event shall any failure of the Construction Manager or Owner to receive certified copies or certificates or policies required under Paragraph 11.1 or to demand receipt of such certified copies or certificates prior to the Contractor's commencing the Work be construed as a waiver by the Owner of the Contractor's obligations to obtain insurance pursuant to this Article 11.

11.1.5 When any required insurance, due to the attainment of a normal expiration date or renewal date, shall expire, the Contractor shall furnish to the Construction Manager Certificates of Insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage as was provided by the previous policy. In the event any renewal or replacement policy, for whatever reason obtained or required, is written by a carrier other than that with whom the coverage was previously placed, or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish the Construction Manager with a certified copy of the renewal or replacement policy unless the Owner provides the Contractor with prior written consent to submit only a Certificate of Insurance for any such policy. All renewal and replacement policies shall be in the form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.

11.1.6 Any aggregate limit under the Contractor's liability insurance shall, by endorsement, apply to this Project separately.

11.1.7 Where the provisions of this Paragraph 11.1 and the Project Manual Section 00620 - Insurance conflict, the stricter provision requiring the more extensive insurance coverage shall control.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is earlier. This insurance shall include

interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.1.1 Property insurance shall be on an "all-risk" policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, falsework, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents.

11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto.

11.3.1.3 If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles.

11.3.1.4 ~~Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also portions of the Work in transit.~~

11.3.1.5 The insurance required by this Paragraph 11.3 is not intended to cover machinery, tools or equipment owned or rented by the Contractor which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance coverage for owned or rented machinery, tools or equipment which shall be subject to the provisions of Subparagraph 11.3.7. Refer to Project Manual Section 00620 - Insurance.

11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager,

Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. ~~The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.~~

11.3.4 The Owner and Construction Manager. "Barton Malow Company", shall be named as an additional insured on all property and liability policies. Refer to Project Manual 00620 - Insurance. If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining 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, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.7 for damages caused by fire or other perils covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor Construction Manager a copy of each policy that includes insurance coverages required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against each other and against the Construction Manager, Architect, Owner's other Contractors and own forces described in Article 6, if any, and the subcontractors, sub-subcontractors, consultants, agents and employees of any of them, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each

in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. This section shall be deemed null and void if its enforcement jeopardizes the Owner's insurance coverage.

11.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary through the Construction Manager 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 Subparagraph 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.9. If after such loss no other special agreement is made, replacement of damaged property shall be covered by appropriate Change Order.

11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.9. The Owner as fiduciary shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.3.11 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 The Contractor shall furnish performance and labor and material payment bonds, in a form satisfactory to the Construction Manager and Owner, and each in the amount of One-Hundred Percent (100%) of its contract amount (unless a lesser amount is specifically authorized in Project Manual Section 00610 - Bonds) covering all Work to be performed by the contractor and its subcontractors and suppliers. The Bonds shall be written in favor of both the Construction Manager and the Owner as dual obligees, using a dual obligee rider that is acceptable to the Owner and the Construction Manager. The Bonds shall also meet all additional requirements set forth in Project Manual Section 00610 - Bonds.~~The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~

11.4.2 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 permit a copy to be made.

11.4.3 Additional Performance and Payment Bonds may be required by the Owner, in the Owner's sole discretion, from any Subcontractor. The Owner shall pay for any premiums charged for obtaining required Subcontractor bonds by executing a Change Order that shall increase the Contract Sum in an amount equal to such premiums. All such bonds shall be in form and substance satisfactory to the Owner in the Owner's sole judgment.

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 required in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

12.2 CORRECTION OF WORK

12.2.1 The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby.

12.2.2 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 Subparagraph 9.9.1, or by terms of an 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 written notice from the Owner or Construction Manager to do so unless the Owner or Construction Manager has previously given the Contractor a written acceptance of such condition. This period of one year 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 performance of the Work. This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition. Refer to Project Manual Section 01740 - Warranties and Guarantees.

12.2.3 The Contractor shall remove from the site portions of the Work which 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 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Construction Manager or from the Architect issued through the Construction Manager, the Owner or Construction Manager may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner or Construction Manager may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not

sufficient to cover such amount, the Contractor shall pay the difference to the Owner through the Construction Manager.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or Construction Manager or other Contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

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

12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

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

13.3 WRITTEN NOTICE

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of

the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice. Owner or Construction Manager as Owner's agent, may, at their option, serve notice on the Contractor by faxing a copy of the notice to the Contractor at its last known facsimile number and subsequently mailing the notice to the Contractor's last known business address.

13.4 RIGHTS AND REMEDIES

13.4.1 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.

13.4.2 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 in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. 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 the Construction Manager and Architect may observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2 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 Subparagraph 13.5.1, 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 the Construction Manager and Architect may observe such procedures. The Owner shall bear such costs except as provided in Subparagraph 13.5.3.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established

by the Contract Documents, the Contractor shall bear 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. The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in its scheduling and performance of the Work, and the cost of testing services related to remedial operations performed to correct deficiencies in the Work, shall be borne by the Contractor.

13.5.4 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.

13.5.5 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.

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

13.6 INTEREST

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

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

13.7.1 As between the Owner and Contractor, the limitation period shall commence to run as determined by state law.-

~~1 Before Substantial Completion. - As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;~~

~~2 Between Substantial Completion and Final Certificate for Payment. - As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and~~

~~3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.~~

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 days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor, for any of the following reasons:

- 1 issuance of an order of a court or other public authority having jurisdiction;
- 2 an act of government, such as a declaration of national emergency, making material unavailable;
- 3 ~~because the Construction Manager or Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.2, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents;~~
- 4 ~~if repeated suspensions, delays or interruptions by the Owner as described in Paragraph 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; or~~
- 5 ~~the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Subparagraph 2.2.1.~~

14.1.2 If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

14.1.3 If the Work is stopped for a period of 60 days or if repeated suspensions, delays, or interruptions by the Owner as described in Paragraph 14.3 constitute in the aggregate the lesser of an amount equal to the Contract time or 120 days in any one (1) year period through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently 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' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.2.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 The Owner may terminate the Contract if the Contractor:

- 1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- 2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- 3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
- 4 otherwise is guilty of substantial breach of a provision of the Contract Documents.
- 5 is petitioned bankrupt, or makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of the Contractor's insolvency.
- 6 breaches any warranty made by the Contractor under or pursuant to the Contract Documents.
- 7 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents.
- 8 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents.

14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon

certification by the Architect that sufficient cause exists to justify such action, 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'~~ seventy-two hours written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 accept assignment of subcontracts pursuant to Paragraph 5.4; and
- .3 finish the Work by whatever reasonable method the Owner may deem expedient.

14.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 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, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner through the Construction Manager. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Architect 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 An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. 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.

14.3.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

14.4 Owner's Termination for Convenience

14.4.1 The Owner reserves the right to terminate the Contract, or any portion thereof, for convenience and without cause, even though the Contractor has not failed to perform any part of the Contract. Termination of the Work hereunder shall be effected by written notice to the Contractor. Upon receipt of such notice, the Contractor shall, unless the notice otherwise directs:

.1 Immediately discontinue the terminated portion of the Work and the placing of all orders and subcontracts in connection with the terminated portion of the Work;

.2 Immediately cancel all of the existing orders and subcontracts in connection with the terminated portion of the Work;

.3 Immediately transfer to the Owner all materials, supplies, Work in progress, appliances, facilities, machinery, and tools acquired by the Contractor in connection with the performance of the terminated portion of the Work, and take such action as may be necessary or as the Owner or Construction Manager may direct for protection and preservation of the work relating to this Contract; and

.4 deliver all plans, drawings, specifications, and other necessary information to the Owner through the Construction Manager.

14.4.2 If the Owner terminates the Contract for convenience, the following shall be the Contractor's exclusive remedies:

14.4.2.1 Reimbursement of all actual expenditures and costs approved by the Owner through the Construction Manager and Architect as having been made or incurred in performing the terminated Work;

14.4.2.2 Reimbursement of expenditures made and costs incurred with the Owner's prior written approval in settling or discharging outstanding commitments entered into by the Contractor in performing the Contract; and

14.4.2.3 Payment of profit, insofar as profit is realized hereunder, of an amount equal to the estimated profit on the entire Contract at the time of termination multiplied by the percentage of completion of the Work. In no event shall the Contractor be entitled to anticipated fees or profits on work not required to be performed.

14.4.3 All obligations of the Contractor under the Contract with respect to completed Work, including but

not limited to all warranties, guarantees, indemnities, insurance and bonds shall apply to all Work completed or substantially completed by the Contractor prior to a convenience termination by the Owner. Notwithstanding the above, any convenience termination by the Owner or payments to the Contractor shall be without prejudice to any claims or legal remedies that the Owner may have against the Contractor for any cause.

14.4.4 Upon a determination that a termination of this Contract, other than a termination for convenience under this Paragraph 14.4, was wrongful or improper for any reason, such termination shall automatically be deemed converted to a convenience termination under this Paragraph 14.4, and the Contractor's remedy for such

wrongful termination shall be limited to the recoveries specified under Subparagraph 14.4.2.

14.4.5 Contractor is required to include a termination for convenience clause in all of its subcontractor and supplier contracts, in substantially similar form as set forth in this Paragraph 14.4, and that limits the subcontractors and suppliers to exclusive remedies no greater than those set forth in Subparagraph 14.4.2 that are available to Contractor. Contractor shall bear all costs arising or related to its failure to include such clause in its subcontracts.

**SECTION 00800
SUPPLEMENTARY GENERAL CONDITIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to the requirements described in Section 00700 General Conditions of the Contract and Section 00500 Agreement Form.

1.02 SUPPLEMENTARY GENERAL CONDITIONS

- A. Document **PCP 14-11, Supplementary Conditions to AIA 201/CMA 1992 When Project is not Subject to Mandatory Arbitration**, is bound within this Project Manual and is a part of the Contract Documents.
- B. Document **PCP 14-12, Supplementary Conditions to AIA 201/CMA 1992 When Owner does not Mutually Waive Subrogation**, is bound within this Project Manual and is a part of the Contract Documents.

These documents are attached immediately following this page.

END OF SECTION 00800

Supplementary Conditions to AIA A201 CMA – 1992 When Project is not Subject to Mandatory Arbitration

Subparagraph 4.5 – Replace “arbitration” with “litigation”.

Subparagraph 4.7.2 – Delete “arbitration or” in the 2nd and 3rd sentences respectively.

Subparagraph 4.7.4 – Replace “arbitration” with “litigation”.

Subparagraph 4.8.4 – Replace “arbitration” with “litigation”.

Subparagraph 4.9.1 – Delete this Subparagraph and replace with “Any controversy or Claim arising out of or related to the Contract, or the breach thereof and not resolved under Paragraph 4.8 shall be subject to litigation in a court of competent jurisdiction.”

Subparagraph 4.9.2 – Delete this Subparagraph.

Subparagraph 4.9.3 – Delete this Subparagraph and replace it with “During litigation or other dispute resolution proceedings, the Owner and Contractor shall comply with Subparagraph 4.7.4.”

Subparagraph 4.9.4 – Delete this Subparagraph and replace it with “When a written decision of the Architect states that (1) the decision is final but subject to litigation then (2) a suit must be filed within 30 days after the date on which the party filing the suit receives the final written decision (unless a longer period of time is agreed upon, in writing, by the other party). Failure to file a suit within said 30 days’ period shall result in the Architect’s decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after litigation has been initiated, such decision may be entered as evidence, but shall not supersede litigation proceedings unless the decision is acceptable to all parties concerned.”

Subparagraph 4.9.4.1 – Delete this Subparagraph.

Subparagraph 4.9.4.2 – Delete this Subparagraph.

Subparagraph 4.9.5 – Delete this Subparagraph.

Subparagraph 4.9.6 – Delete this Subparagraph.

Subparagraph 4.9.7 – Delete this Subparagraph.

Subparagraph 8.3.1 – Replace “arbitration” with “dispute resolution”.

Subparagraph 9.7.1 – In the first sentence, replace “arbitration” with “litigation”.

Subparagraph 10.1.2 – Replace both occurrences of “arbitration” with “litigation”.

Subparagraph 11.3.9 – Replace “or in accordance with an arbitration award, in which case the procedure shall be as provided in Paragraph 4.9” with “or in accordance with a court judgment or order.”

Subparagraph 11.3.10 – In the first sentence delete “, if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.9.” Delete the 2nd and 3rd sentences in their entirety.

**Supplementary Conditions to
AIA A201 CMA – 1992
When Owner does not Mutually Waive Subrogation**

Subparagraph 11.3.7 – Replace entire Subparagraph with the following: “The Contractor waives all rights against the Owner and against the Construction Manager, Architect, Owner’s other Contractors and own forces described in Article 6, if any, and the subcontractors, sub-subcontractors, consultants, agents and employees of any of them, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as the Contractor may have to the proceeds of such insurance. The Contractor shall require the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements written where legally required for validity, similar waivers each in favor of the Owner, the Construction Manager and the Architect. The policies shall provide for such waivers by endorsement or otherwise.”

SECTION 00810
ON-SITE PROJECT SAFETY AND LOSS CONTROL PROGRAM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 CONTRACTOR'S SAFETY REQUIREMENTS

A. Generally

1. **Contractor** is responsible for its own Safety Program for Work on this Project that is at least as stringent as the requirements set forth in this section of the Project Manual.
2. **Contractor** shall provide a safe workplace and shall otherwise take all precautions for the safety of Subordinate Parties and persons and property in or near the premises where Work is being performed.
3. **Contractor** shall comply with all applicable federal, state and local laws, rules and regulations, including, but not limited to, applicable provisions of the Occupational Safety and Health Act ("OSHA") and/or the governing state law.
4. **Contractor** shall comply with all requirements stated in the Site Specific Safety Instructions (SSSI) form or elsewhere in the Contract Documents.
5. **Contractor** shall ensure that its employees understand and comply with applicable safety and health programs, rules, and regulations.
6. **Contractor** will assign an individual to act as Safety Representative who will have the responsibility of resolving safety matters, and act as a liaison among **Contractor**, Barton Malow Company and the Owner. The Safety Representative must be a person who is capable of identifying existing and predictable hazards in surroundings that are unsanitary, hazardous or dangerous to employees, and has the authority to take prompt corrective measures to eliminate them. The Safety Representative must meet the standards for a Competent Person under applicable law when required (scaffolding, confined spaces, etc.). The Safety Representative must be on site full time. The Safety Representative or an alternate must attend periodic safety meetings as directed by Barton Malow Company.
7. **Contractor** shall ensure that its site supervisors and/or Safety Representative attend a pre-construction meeting where planning for safe execution of the project will be addressed:
8. **Contractor** is fully responsible for all Hazardous Materials it creates or releases in connection with, or brings to, the Project. **Contractor** shall immediately report to Barton Malow Company any Hazardous Materials that it discovers or which are released at the Project.
9. Minimum training for on-site employees shall include basic safety orientation, task-specific safety instruction, weekly Tool Box Talks, and other periodic safety meetings. **Contractor** shall document all such training.
10. **Contractor** shall self-inspect its areas of control to assure compliance with the safety requirements.

11. All on-site employees of either **Contractor** or its Subordinate Parties are required to report any unsafe act or condition and any work-related injuries or illness immediately to a supervisor. If the act or condition can be safely and easily corrected, the employee or supervisor should make the correction.
12. **Contractor** shall notify Barton Malow Company immediately of all injuries requiring clinical attention and all property damage potentially in excess of \$1,000.
13. **Contractor** shall have emergency procedures to deal with the immediate removal and treatment, if necessary, of any employee who may be injured or become ill. **Contractor** shall keep on the Project site a first-aid kit supplied according to current regulations, and shall have on-site a person trained to administer first aid.
14. **Contractor** shall inform Barton Malow Company of the arrival of any federal or state inspector or compliance officer prior to touring the site. Any reports, citations, or other documents related to the inspection shall be provided promptly to Barton Malow.
15. **Contractor** shall have a written Substance Abuse Policy. The use or possession of illegal drugs or the use of alcohol while performing Work on the Project are strictly prohibited and may lead to immediate removal from the Project.
16. **Contractor** shall be responsible for payment of all safety-related citations, fines and/or claims arising out of or relating to its Work levied against the Owner, Architect, Barton Malow Company, or their employees or affiliates.
17. Barton Malow has the right to require that **Contractor** submit monthly its hours worked and incident rates for the Project.

B. Additional Barton Malow Requirements

1. Work crews shall conduct a Job Hazard Analysis (JHA) discussion to plan for safe performance before beginning any work task. **Contractor** is encouraged to prepare a written record of each JHA.
2. All workers, management, and visitors shall wear approved hard hats while on site, outside the trailers. Cowboy-style hard hats are prohibited. Hardhats must not be removed to use welding shields. Welding shields must attach to hardhats or be hand held.
3. Sleeved shirts (minimum of four inches), long pants, and durable work boots are required minimum clothing.
4. Personal cell phones are not to be used on construction sites except to report an emergency or on approved break time. Use of business cell phones must not interfere with jobsite safety.
5. Personal radios or music players with earphones are not permitted.
6. **All persons working at elevations of six feet or greater must have 100% continuous fall protection. Engineering controls are preferred, but personal fall arrest systems are also permissible. An exception is permitted for safe use of ladders up to 24 feet long.**
7. **Contractor** is responsible to repair or restore any barricade that it modifies or removes.
8. Class III (household) stepladders are prohibited; metal ladders are strongly discouraged.
9. All scaffolds must be checked daily and before each use for safety compliance. Scaffolds shall never be left in an unsafe condition and must be removed/disabled immediately if not to be used again.

10. All persons operating cranes must be certified as crane operators by the National Commission on the Certification of Crane Operators (NCCCO). Daily crane inspection reports must be prepared by the operator and kept with the crane, available for inspection.
11. Riding the headache ball is prohibited.
12. All dozers, loaders, tractors and end loader backhoes must have functioning backup alarms.
13. Keep equipment at least 15 feet from energized power lines.
14. Electrical, pneumatic, and other energy systems that could be accidentally energized or started up while work is in process must be locked out (not merely tagged out).
15. Only fire retardant materials may be used to build shanties or other temporary enclosures inside of buildings finished or under construction. Shanties shall be continually policed by their occupants to prevent the accumulation of waste or other combustibles.
16. Engineering controls must be used to restrain silica dust per applicable law.

1.03 **CONTRACTOR’S SAFETY SUBMITTALS**

- A. **Contractor** shall provide copies of the following written safety submittals to Barton Malow Company at the times indicated:

Submittal	Timing
Contractor Safety Certificate, Barton Malow form SAF 6.3.3.3	Before on-site work begins
Site-specific Safety Program, including substance abuse policy, hazard communication program, and Material Safety Data Sheets (MSDS)	Before on-site work begins
Tool Box Talk Reports	Weekly
Incident Reports (OSHA form 301 or equivalent)	Within 24 hours of incident
Hours worked and incident rates	Monthly (if applicable)

- B. Barton Malow’s receipt of the Safety Program or other submittals from **Contractor** does not constitute approval of the Program or submittal or permission to deviate from the requirements of the Contract Documents and applicable law.
- C. **Contractor** will allow inspection of, and Barton Malow Company may request copies of, any and all safety-related documents and records in its possession relating to the Project.

1.04 **BARTON MALOW COMPANY RIGHTS**

- A. **Safety Hazard Notifications** may be issued to the **Contractor** when an unsafe act or condition is reported or observed. Barton Malow Company shall not be required to supervise the abatement or associated reprimand of unsafe acts or conditions within a **Contractor’s** scope of work as this is solely the responsibility of **Contractor**. Nevertheless, Barton Malow Company has the right, but not the obligation, to require **Contractor** to cease or abate any unsafe practice or activity it notices, at **Contractor’s** sole expense.
- B. **Contractor’s** failure to comply with the contract safety requirements will be considered a default of the Agreement, and may result in remedial action including, but not limited to, withholding of payment of any sums due or termination.

- C. Barton Malow Company's failure to require the submission of any form, documentation, or any other act required under this Section, 00810, of the Project Manual shall not relieve the **Contractor** from any of its safety obligations.
- D. Nothing in this Section or in this Agreement makes Barton Malow Company responsible or liable for protecting **Contractor's** employees and other Subordinate Parties or assuring or providing for their safety or preventing accidents or property damage.
- E. All requirements referenced in this Section 00810 are binding on **Contractor** and all of its Subordinate Parties, even where such requirements may exceed the standards of applicable law.

1.05 SAFETY RELATED FORMS

- A. The following safety related forms are in Section 01600 Forms:

Trade Contractor Safety Certificate, Barton Malow Form SAF 6.3.3.3/CON 7.9

END OF SECTION 00810

**SECTION 00840
HAZARDOUS MATERIALS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
1. Definition of Hazardous Materials
 2. Awareness of Hazardous Materials

PART 2 - HAZARDOUS MATERIALS**2.01 DEFINITION OF HAZARDOUS MATERIALS**

- A. A "Hazardous Material", as used in this Project Manual means asbestos; asbestos containing material; lead (including lead-based paint); PCB; molds; any other chemical, material, or substance subject to regulation as a hazardous material, hazardous substance, toxic substance, or otherwise, under applicable federal, state, or local law; and any other chemical, material, or substance that may have adverse effects on human health or the environment.

2.02 AWARENESS OF HAZARDOUS MATERIALS

- A. Each Contractor shall be constantly aware of the possible discovery of Hazardous Materials. Should Contractor encounter any Hazardous Material or suspected Hazardous Material, the Contractor shall immediately stop Work in the area affected and report the condition to Barton Malow Company.
- B. If the Contractor encounters any Hazardous Material or suspected Hazardous Material, the Contractor agrees to immediately initiate the required procedures of the Environmental Protection Agency (EPA), and/or state or local agencies having jurisdiction to protect any and all persons exposed to the affected areas or adjacent areas affected thereby.
- C. Contractor is fully responsible for all Hazardous Materials it creates or releases in connection with, or brings to, the Project.
- D. See the General and Supplementary Conditions of the Agreement for further instructions and obligations related to Hazardous Materials.
- E. Each Contractor shall be responsible to bind ALL of its personnel and its Subordinate Parties to the provisions in these paragraphs and to instruct each employee of the of its duty to report any and all suspected Hazardous Materials and to comply with all applicable laws.
- F. **ABSOLUTELY NO MATERIAL SHALL BE BROUGHT ON OR TO THE PROJECT SITE THAT DOES NOT HAVE A MANUFACTURER'S LABEL STATING CONTENTS.**
- G. The Contractor shall comply with all applicable federal and state laws, rules, ordinances and regulations regarding transportation, storage, spills, releases and disposal of Hazardous Materials.

- H. No asbestos or asbestos-containing material will be brought to the jobsite or incorporated into the Work by Contractor or its Subordinate Parties.

END OF SECTION 00840

**SECTION 00870
LABOR RELATIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

PART 2 SCOPE

2.01 PREVAILING WAGES

- A. In any Agreement entered into pursuant to this advertisement, the Contractor shall comply with the provisions of the PREVAILING WAGE LAW.

The Contractor will pay the latest prevailing wages and fringe benefits for all Work as required by State of Michigan/Public Act 166 dated 1965 as amended. The prevailing wage and fringe benefit rates are included immediately behind this Section. NOTE: IN MICHIGAN, THE OWNER PROVIDES THE CURRENT PREVAILING WAGE (90 DAY DOCUMENT).

- B. Additionally, Contractor is required to comply with all other provisions of the governing prevailing wage law, and shall ensure its Subordinate Parties' compliance therewith.
- C. Allegations that individuals working on this Project are not receiving compensation required by law are considered seriously by the Owner and the Construction Manager. In order to expedite the resolution of prevailing wage complaints related to this Project, the Owner and Construction Manager have determined that the Michigan Fair Contracting Center ("MFCC") is the organization best equipped to expedite the investigation of these matters. Any person or entity (the "Complainant") who reasonably believes that a particular contractor, subcontractor, sub-subcontractor, supplier or other person or entity providing labor, materials, goods or services on this Project (each, an "Employer") is not paying prevailing wages as required by applicable law may ask the MFCC to determine whether proper rates are being paid either by completing and submitting to MFCC a request for assistance (the "RFA") or by contacting MFCC by telephone at (734) 462-2330 or (877) 611-6322. The RFA can be downloaded electronically at <http://mifcc.org/Brochures/KnowYourRights.pdf> and delivered to MFCC by facsimile to (734) 462-2318 or by mail to P.O. Box 530492, Livonia, Michigan 48153-0492.

Each and every Employer who is subject to an audit by MFCC pursuant to any RFA shall cooperate and comply fully with all requests, requirements and inquiries of MFCC. If, after investigation, MFCC determines that a Complainant's allegations are meritorious and the Complainant, MFCC and the Employer are unable to resolve the dispute following MFCC's determination, then, under the direction and with the assistance of MFCC, the Complainant shall file a Prevailing Wage Complaint (the "PWC") with the State of Michigan Department of Labor and Economic Growth Wage and Hour Division (the "Wage and Hour Division"). The PWC can be downloaded electronically at <http://mifcc.org/Brochures/PrevailingWageComplaint.pdf> and delivered by facsimile to (517) 322-6352 or by mail to 7150 Harris Drive, P.O. Box 30476, Lansing, Michigan 48909-7076.

Upon commencement of the audit from MFCC, the Owner and/or Barton Malow Company reserves the right to hold all payments, pending the conclusion of the audit. If the Wage and Hour Division determines that the Employer has violated any applicable prevailing wage law, then the Owner and/or Construction Manager shall automatically be entitled to and will (a) withhold from such Employer any and all payments due and owing until the Employer remedies any and all violations cited by the Wage and Hour Division, and (b) backcharge the Employer for all costs actually incurred in MFCC's audit of the Employer.

The Owner and/or Construction Manager shall keep a hard copy of these requirements posted at the Project site at all times.

- D. The **Contractor** shall be financially responsible for the payment of prevailing wages by all Subordinate Parties that are subject to the prevailing wage law for Work on the Project.
- E. If there is a dispute between any **Contractor** and the unions, the **Contractor** will be required to meet with Barton Malow Company and the Union involved to try and resolve the issue.
- F. Because Work on this Project is covered by the Michigan Prevailing Wage Act (“Act”), the **Contractor** and its subcontractors and other Subordinate Parties that are governed by the prevailing wage law shall pay all hours at the prevailing wage rates at the applicable hourly rate; no Work performed by or on behalf of the **Contractor** on this Project will be paid on a lump sum basis or a piece rate basis in violation of the Act.
- G. The **Contractor** will pay its workers at wage and fringe benefit rates consistent with the Act regardless of whether the workers are classified as employees or independent contractors.
- H. The **Contractor** shall not misclassify any work assignments, but shall in each and every case follow proper jurisdictional assignments in compliance with the Act.
- I. The **Contractor** shall assure that any persons paid at apprentice rates under the Act are properly classified as apprentices by actual participation in a BAT certified program or as may otherwise be permitted by the Act.

END OF SECTION 00870

Official Request 187
Requestor: TROY SCHOOL DISTRICT

Project Description: CONCESSION REMODELING
Project Number: ATHENS HIGH SCHOOL

Oakland County
Official 2007 Prevailing Wage Rates for State Funded Projects

Issue Date: 2/13/2007
Contract must be awarded by 5/14/2007
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<u>Classification</u>			Straight	Time and	Double				
Name	Description		Hourly	a Half	Time	Overtime	Provision		
Asbestos & Lead Abatement Laborer									
Asbestos & Lead Abatement Laborer		MLDC	\$31.30	\$41.83	\$52.35	H H H	X X X	X X X	D Y
Asbestos & Lead Abatement, Hazardous Material Handler									
Asbestos and Lead Abatement, Hazardous Material Handler		AS207	\$31.30	\$43.13	\$54.95	X X X	X X X	X X X	D Y
Boilermaker									
Boilermaker		BO169	\$48.71	\$68.13	\$87.54	H H D	H D D	D D D	D Y
		Apprentice Rates:							
		1st 6 months	\$37.07	\$50.67	\$64.26				
		2nd 6 months	\$38.03	\$52.10	\$66.18				
		3rd 6 months	\$39.00	\$53.56	\$68.12				
		4th 6 months	\$39.97	\$55.02	\$70.06				
		5th 6 months	\$40.58	\$56.11	\$71.64				
		6th 6 months	\$42.88	\$59.38	\$75.88				
		7th 6 months	\$44.83	\$62.31	\$79.78				
		8th 6 months	\$46.77	\$65.21	\$83.66				
Bricklayer									
Bricklayer, stone mason, pointer, cleaner, caulker		BR1	\$47.76	\$71.64	\$95.52	H H D	H D D	D D D	D N
		Apprentice Rates:							
		First 6 months	\$30.33	\$45.50	\$60.66				
		2nd 6 months	\$32.21	\$48.32	\$64.42				
		3rd 6 months	\$34.10	\$51.15	\$68.20				
		4th 6 months	\$35.98	\$53.97	\$71.96				
		5th 6 months	\$37.86	\$56.79	\$75.72				
		6th 6 months	\$39.73	\$59.60	\$79.46				

Official Request #: 187
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County: Oakland

Official Rate Schedule

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Classification	Straight	Time and	Double		
Name Description	Hourly	a Half	Time	Overtime Provision	

Carpenter

Carpet and Resilient Floor Layer, (does not include installation of prefabricated formica & parquet flooring which is to be paid carpenter rate)	CA1045	\$40.22	\$56.42	\$72.61	H H H H D D D D N
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Apprentice Rates:

1st 6 months	\$20.93	\$25.25	\$31.05
2nd 6 months	\$24.02	\$31.26	\$39.07
3rd 6 months	\$25.64	\$33.59	\$42.17
4th 6 months	\$27.26	\$35.95	\$45.33
5th 6 months	\$28.87	\$38.28	\$48.43
6th 6 months	\$30.50	\$40.64	\$51.57
7th 6 months	\$32.11	\$42.96	\$54.67
8th 6 months	\$33.73	\$45.30	\$57.79

Carpenter, piledriver	CA687Z1	\$44.37	\$62.97	\$81.56	H H D H D D D D Y
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Apprentice Rates:

1st Year	\$27.63	\$37.85	\$48.08
3rd 6 months	\$29.49	\$40.65	\$51.80
4th 6 months	\$31.34	\$43.42	\$55.50
5th 6 months	\$33.21	\$46.23	\$59.24
6th 6 months	\$35.08	\$49.03	\$62.98
7th 6 months	\$36.92	\$51.79	\$66.66
8th 6 months	\$38.80	\$54.61	\$70.42

Cement Mason

Cement Mason	CE514	\$42.63	\$60.13	\$77.63	H H D H H H H D N
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Apprentice Rates:

1st 6 months	\$24.90	\$33.67	\$42.43
2nd 6 months	\$26.65	\$36.28	\$45.92
3rd 6 months	\$30.15	\$41.55	\$52.93
4th 6 months	\$33.66	\$46.80	\$59.94
5th 6 months	\$35.40	\$49.43	\$63.44
6th 6 months	\$38.92	\$54.70	\$70.47

Drywall

Drywall Taper	PT-22-D	\$38.45	\$50.90	\$63.35	H H D H D D D D N
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Apprentice Rates:

First 3 months	\$26.00	\$32.23	\$38.45
Second 3 months	\$28.49	\$35.96	\$43.43
Second 6 months	\$30.98	\$39.69	\$48.41
Third 6 months	\$33.47	\$43.43	\$53.39
4th 6 months	\$34.71	\$45.29	\$55.87

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Classification	Name	Description	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Electrician, Inside wireman						
	Electrician, Inside Wireman	EC-58-IW	\$46.88	\$64.00	\$81.13	H H H H H H D N
		Apprentice Rates:				
		0-1000 hours	\$26.33	\$33.18	\$40.03	
		1000-2000 hours	\$28.04	\$35.75	\$43.45	
		2000-3500 hours	\$29.75	\$38.31	\$46.87	
		3500-5000 hours	\$31.47	\$40.90	\$50.31	
		5000-6500 hours	\$34.89	\$46.03	\$57.15	
		6500-8000 hours	\$38.32	\$51.17	\$64.01	
Elevator Constructor						
	Elevator Constructor	EL 36	\$47.71		\$81.45	D D D D D D D Y
	Elevator Constructor					
		Apprentice Rates:				
		1st Year Apprentice	\$31.14		\$49.70	
		2nd Year Apprentice	\$34.82		\$56.75	
		3rd Year Apprentice	\$36.66		\$60.28	
		4th Year Apprentice	\$40.34		\$67.33	
Glazier						
	Glazier	GL-357	\$41.56	\$55.41		H H H H H H H Y
		Apprentice Rates:				
		1st 6 months	\$28.36	\$35.29		
		2nd 6 months	\$29.82	\$37.44		
		3rd 6 months	\$32.72	\$41.72		
		4th 6 months	\$34.18	\$43.87		
		5th 6 months	\$35.64	\$46.03		
		6th 6 months	\$37.09	\$48.17		
		7th 6 months	\$38.54	\$50.31		
		8th 6 months	\$41.46	\$54.62		
Heat and Frost Insulator and Asbestos Worker						
	Heat and Frost Insulators and Asbestos Workers	AS25	\$42.80	\$56.56	\$70.32	H H H H H H D Y
		Apprentice Rates:				
		1st Year	\$25.05	\$32.62	\$40.19	
		2nd Year	\$32.83	\$41.78	\$50.72	
		3rd Year	\$34.54	\$44.17	\$53.80	
		4th Year	\$37.30	\$48.31	\$59.32	
Ironworker						
	Fence Erecting	IR-25-F	\$39.87	\$59.58	\$79.29	H H D H H H D D Y
	Glazing	IR-25-GZ1	\$48.48	\$72.64	\$96.65	H H D H H H D D Y

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Mesh Iron Work	IR-25-MR	\$42.25	\$60.43	\$78.60	H H D H D D D D N
Pre-engineered Metal Work	IR-25-PE-Z1&Z2	\$39.88	\$50.38	\$60.88	H H H X X X X D Y
	Apprentice Rates:				
	1st Level	\$22.79	\$27.88	\$32.97	
	2nd Level	\$24.01	\$29.61	\$35.21	
	3rd Level	\$25.25	\$31.36	\$37.47	
	4th Level	\$26.47	\$33.08	\$39.70	
	5th Level	\$27.70	\$34.83	\$41.95	
	6th Level	\$28.93	\$36.56	\$44.20	
Reinforced Iron Work	IR-25-RF	\$47.46	\$68.09	\$88.71	H H D H D D D D N
Rigging Work	IR-25-RIG	\$52.48	\$78.56	\$104.64	H H H H H H H D N
Siding & Decking	IR-25-SD	\$45.10	\$67.43	\$89.75	H H D H H H D D Y
Structural, ornamental, conveyor, welder and pre-cast Apprentice rates apply to structural, conveyer, fence, glazing, reinforced, rigging, & siding decking	IR-25-STR	\$52.61	\$78.69	\$104.77	H H D H H H D D Y
	Apprentice Rates:				
	Level 1	\$26.51	\$39.54	\$52.57	
	Level 2	\$29.12	\$43.46	\$57.79	
	Level 3	\$31.73	\$47.37	\$63.01	
	Level 4	\$34.34	\$51.29	\$68.23	
	Level 5	\$36.94	\$55.19	\$73.43	
	Level 6	\$39.57	\$59.13	\$78.69	
	Level 7	\$42.16	\$63.02	\$83.87	
	Level 8	\$44.78	\$66.95	\$89.11	
Industrial Door erection & construction	IR-25-STR-D	\$34.69	\$46.09	\$57.48	H H D H H H D D Y
Laborer					
Construction Laborer, Mason Tender, Carpenter Tender, Drywall Handler, Cement Finisher tender, concrete chute and concrete Bucket Handler, Concrete Laborer, Demolition Laborer	L1076-A-A	\$36.48	\$51.89	\$67.29	H H D H D D D D Y
	Apprentice Rates:				
	0-1,000 work hours	\$30.91	\$43.53	\$56.15	
	1,001-2,000 work hours	\$32.02	\$45.20	\$58.37	
	2,001-3,000 work hours	\$33.14	\$46.88	\$60.61	
	3,001-4,000 work hours	\$35.37	\$50.23	\$65.07	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Signal man (on sewer & caisson work); air,electric or gasoline tool operator (including concrete vibrator operator,acetylene torch & air hammer operator); scaffold builder, caisson worker	L1076-A-B	\$36.74	\$52.28	\$67.81	H H D H D D D D Y
Lansing Burner, Blaster & Powder Man	L1076-A-C	\$37.23	\$53.01	\$68.79	H H D H D D D D Y
Furnance battery heater tender, burning bar & oxy-acetylene gun, expediter man, top man and/or bottom man (blast furnace work)	L1076-A-D	\$36.98	\$52.64	\$68.29	H H D H D D D D Y
Cleaner/ sweeper laborer, furniture laborer	L1076-A-E	\$31.03	\$43.71	\$56.39	H H D H D D D D Y
Plasterer Tender, Plastering Machine Operator	LPT-1	\$37.86	\$53.96	\$70.05	H H D H D D D D N
Apprentice Rates:					
		0 - 1,000 hours	\$30.91	\$43.53	\$56.15
		1,001 - 2,000 hours	\$32.02	\$45.20	\$58.37
		2,001 - 3,000 hours	\$33.14	\$46.88	\$60.61
		3,001 - 4,000 hours	\$35.37	\$50.23	\$65.07
Laborer - Hazardous					
Class A Laborer - performing work in conjunction with site preparation and other preliminary work prior to actual removal, handling, or containment of hazardous waste substances not requiring use of personal protective equipment required by state or federal regulations; or a laborer performing work in conjunction with the removal, handling, or containment of hazardous waste substances when used of personal protective equipment level "D" is required.	LHAZ-Z2-A	\$36.48	\$51.89	\$67.29	H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$30.91	\$43.53	\$56.15
		1,001-2,000 work hours	\$32.02	\$45.20	\$58.37
		2,001-3,000 work hours	\$33.14	\$46.88	\$60.61
		3,001-4,000 work hours	\$35.37	\$50.23	\$65.07
Class B Laborer - performing work in conjunction with the removal, handling, or containment of hazardous waste substances when the use of personal protective equipment levels "A", "B" or "C" is required.	LHAZ-Z2-B	\$37.48	\$53.39	\$69.29	H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$31.66	\$44.66	\$57.65
		1,001-2,000 work hours	\$32.82	\$46.40	\$59.97
		2,001-3,000 work hours	\$33.99	\$48.15	\$62.31
		3,001-4,000 work hours	\$36.32	\$51.65	\$66.97

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer Underground - Tunnel, Shaft & Caisson					
Class I - Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.	LAUCT-Z1-1	\$32.54	\$43.21	\$53.88	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.70	\$35.95	\$44.20	
	1,001-2,000 work hours	\$28.67	\$37.40	\$46.14	
	2,001-3,000 work hours	\$29.64	\$38.86	\$48.08	
	3,001-4,000 work hours	\$31.57	\$41.76	\$51.94	
Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder.	LAUCT-Z1-2	\$32.65	\$43.38	\$54.10	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.79	\$36.08	\$44.38	
	1,001-2,000 work hours	\$28.76	\$37.54	\$46.32	
	2,001-3,000 work hours	\$29.73	\$39.00	\$48.26	
	3,001-4,000 work hours	\$31.68	\$41.92	\$52.16	
Class III - Air tool operator (jack hammer man, bush hammer man and grinding man), first bottom man, second bottom man, cage tender, car pusher, carrier man, concrete man, concrete form man, concrete repair man, cement invert laborer, cement finisher, concrete shoveler, conveyor man, floor man, gasoline and electric tool operator, gunnite man, grout operator, welder, heading dinky man, inside lock tender, pea gravel operator, pump man, outside lock tender, scaffold man, top signal man, switch man, track man, tugger man, utility man, vibrator man, winch operator, pipe jacking man, wagon drill and air track operator and concrete saw operator (under 40 h.p.).	LAUCT-Z1-3	\$32.71	\$43.47	\$54.22	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.83	\$36.14	\$44.46	
	1,001-2,000 work hours	\$28.81	\$37.62	\$46.42	
	2,001-3,000 work hours	\$29.78	\$39.07	\$48.36	
	3,001-4,000 work hours	\$31.73	\$42.00	\$52.26	
Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.	LAUCT-Z1-4	\$32.89	\$43.74	\$54.58	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.97	\$36.36	\$44.74	
	1,001-2,000 work hours	\$28.95	\$37.82	\$46.70	
	2,001-3,000 work hours	\$29.94	\$39.31	\$48.68	
	3,001-4,000 work hours	\$31.91	\$42.26	\$52.62	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Class V - Tunnel, shaft and caisson miner, drill runner, keyboard operator, power knife operator, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars)	LAUCT-Z1-5	\$33.14	\$44.11	\$55.08	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$28.16	\$36.64	\$45.12	
	1,001-2,000 work hours	\$29.15	\$38.12	\$47.10	
	2,001-3,000 work hours	\$30.15	\$39.62	\$49.10	
	3,001-4,000 work hours	\$32.14	\$42.61	\$53.08	
Class VI - Dynamite man and powder man.	LAUCT-Z1-6	\$33.47	\$44.61	\$55.74	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$28.40	\$37.00	\$45.60	
	1,001-2,000 work hours	\$29.42	\$38.53	\$47.64	
	2,001-3,000 work hours	\$30.43	\$40.04	\$49.66	
	3,001-4,000 work hours	\$32.46	\$43.09	\$53.72	
Class VII - Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes and flagstones.	LAUCT-Z1-7	\$26.75	\$34.53	\$42.30	H H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$23.36	\$29.44	\$35.52	
	1,001-2,000 work hours	\$24.04	\$30.46	\$36.88	
	2,001-3,000 work hours	\$24.72	\$31.48	\$38.24	
	3,001-4,000 work hours	\$26.07	\$33.50	\$40.94	
Landscape Laborer					
Landscape specialist includes; air, gas, and diesel equipment operator, lawn sprinkler installer.	LLAN-Z1-A	\$23.38	\$32.46	\$41.54	X X H X X X H D Y
Landscape laborer; small power tool operator, lawn sprinkler installer helper, material mover, truck driver.	LLAN-Z1-B	\$19.16	\$26.13	\$33.10	X X H X X X H D Y
Marble Finisher					
Marble Finisher	TT32-MF	\$38.37	\$48.46	\$58.54	H H D H D D D D N
Apprentice Rates:					
	Level 1	\$18.73	\$24.22	\$29.71	
	Level 2	\$19.79	\$25.81	\$31.83	
	Level 3	\$23.93	\$30.38	\$36.83	
	Level 4	\$25.23	\$32.33	\$39.43	
	Level 5	\$26.56	\$33.85	\$41.14	
	Level 6	\$27.99	\$35.64	\$43.28	
	Level 7	\$29.48	\$37.17	\$44.85	
	Level 8	\$30.80	\$38.73	\$46.65	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Marble Mason					
Marble Mason	TT32-MM	\$44.26	\$57.29	\$70.32	H H D H D D D D N
	Apprentice Rates:				
	Level 1	\$24.21	\$31.14	\$38.06	
	Level 2	\$26.93	\$34.56	\$42.20	
	Level 3	\$29.70	\$37.59	\$45.48	
	Level 4	\$32.10	\$40.83	\$49.56	
	Level 5	\$34.18	\$43.17	\$52.16	
	Level 6	\$37.52	\$48.11	\$58.71	
	Level 7	\$38.55	\$49.53	\$60.51	
	Level 8	\$39.18	\$50.47	\$61.77	
Operating Engineer					
Crane with boom & jib or leads 120' or longer	EN-324-A120	\$47.81	\$64.26	\$80.70	H H D H D D D D Y
Crane with boom & jib or leads 140' or longer	EN-324-A140	\$48.63	\$65.49	\$82.34	H H D H D D D D Y
Crane with boom & jib or leads 220' or longer	EN-324-A220	\$48.93	\$65.94	\$82.94	H H D H D D D D Y
Crane with boom & jib or leads 300' or longer	EN-324-A300	\$50.43	\$68.19	\$85.94	H H D H D D D D Y
Crane with boom & jib or leads 400' or longer	EN-324-A400	\$51.93	\$70.44	\$88.94	H H D H D D D D Y
Compressor or welding machine	EN-324-CW	\$36.96	\$47.98	\$59.00	H H D H D D D D Y
Forklift, lull, extend-a-boom forklift	EN-324-FL	\$44.27	\$58.95	\$73.62	H H D H D D D D Y
Fireman or oiler	EN-324-FO	\$35.93	\$46.44	\$56.94	H H D H D D D D Y
Regular crane, job mechanic, concrete pump	EN-324-RC	\$46.95	\$62.97	\$78.98	H H D H D D D D Y
Regular engineer, hydro-excavator, remote controlled concrete breaker	EN-324-RE	\$45.98	\$61.51	\$77.04	H H D H D D D D Y
	Apprentice Rates:				
	Period 1	\$36.47	\$47.34	\$58.22	
	Period 2	\$38.02	\$49.67	\$61.32	
	Period 3	\$39.57	\$52.00	\$64.42	
	Period 4	\$41.12	\$54.32	\$67.52	
	Period 5	\$42.68	\$56.66	\$70.64	
	Period 6	\$44.23	\$58.99	\$73.74	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer - Marine Construction					
Diver/Wet Tender, Engineer (hydraulic dredge)	GLF-1	\$49.29	\$64.74	\$80.19	X X H H H H H D Y
Holidays paid at \$95.64 per hour					
<u>Subdivision of county</u> all Great Lakes, islands therein, & connecting & tributary waters					
Crane/Backhoe Operator, Mechanic/Welder, Assistant Engineer (hydraulic dredge), Leverman (hydraulic dredge), Diver Tender	GLF-2	\$47.79	\$62.49	\$77.19	X X H H H H H D Y
Holidays paid \$91.89 per hour					
<u>Subdivision of county</u> All Great Lakes, islands therein, & connecting & tributary waters					
Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs. or more), Tug/Launch Operator, Loader, Dozer and like equipment on Barge, Breakwater Wall, Slip/Doc or Scow, Deck Machinery	GLF-3	\$44.59	\$57.69	\$70.79	X X H H H H H D Y
Holidays paid at \$83.89 per hour					
<u>Subdivision of county</u> All Great Lakes, islands therein, & connecting & tributary waters					
Deck Equipment Operator, (Machineryman/Fireman), (4 equipment units or more), Deck Hand, Deck Engineer, & Crane Maintenance 50 ton capacity and under or Backhoe weighing 115,000 lbs or less, Assistant Tug Operator	GLF-4	\$40.19	\$51.09	\$61.99	X X H H H H H D Y
Holidays paid at \$72.89 per hour					
<u>Subdivision of county</u> All Great Lakes, islands therein, & connecting & tributary waters					
Operating Engineer Hazardous Waste Class I					
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWCI-Z1A	\$46.22	\$61.89	\$77.55	H H H H H H H D Y
Apprentice Rates:					
		1st 6 months	\$36.62	\$47.58	\$58.55
		2nd 6 months	\$38.18	\$49.92	\$61.67
		3rd 6 months	\$39.75	\$52.28	\$64.81
		4th 6 months	\$41.31	\$54.62	\$67.93
		5th 6 months	\$42.89	\$56.99	\$71.09
		6th 6 months	\$44.45	\$59.33	\$74.21

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Classification Name Description	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing. EN-324-HWCI-Z1B	\$45.27	\$60.46	\$75.65	H H H H H H H D Y
Apprentice Rates:				
1st 6 months	\$35.95	\$46.59	\$57.21	
2nd 6 months	\$37.48	\$48.88	\$60.27	
3rd 6 months	\$39.00	\$51.16	\$63.31	
4th 6 months	\$40.85	\$53.93	\$67.01	
5th 6 months	\$42.04	\$55.72	\$69.39	
6th 6 months	\$43.56	\$58.00	\$72.43	
Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats. EN-324-HWCI-Z1D	\$43.97	\$58.51	\$73.05	H H H H H H H D Y
Apprentice Rates:				
1st 6 months	\$35.05	\$45.23	\$55.41	
2nd 6 months	\$36.51	\$47.43	\$58.33	
3rd 6 months	\$37.95	\$49.58	\$61.21	
4th 6 months	\$39.42	\$51.79	\$64.15	
5th 6 months	\$40.86	\$53.95	\$67.03	
6th 6 months	\$42.32	\$56.13	\$69.95	
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats. EN-324-HWCI-Z1DCL	\$43.72	\$58.14	\$72.55	H H H H H H H D Y
Apprentice Rates:				
1st 6 months	\$34.87	\$44.96	\$55.05	
2nd 6 months	\$36.31	\$47.12	\$57.93	
3rd 6 months	\$37.76	\$49.30	\$60.83	
4th 6 months	\$39.20	\$51.45	\$63.71	
5th 6 months	\$40.63	\$53.60	\$66.57	
6th 6 months	\$42.08	\$55.78	\$69.47	
Operating Engineer Hazardous Waste Class II				
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection. EN-324-HWCII-Z1A	\$41.99	\$55.54	\$69.09	H H H H H H H D Y
Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing. EN-324-HWCII-Z1B	\$41.04	\$54.12	\$67.19	H H H H H H H D Y

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1D	\$39.74	\$52.17	\$64.59	H H H H H H D Y
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1DCL	\$39.49	\$51.79	\$64.09	H H H H H H D Y
Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads 140' or longer					
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HW140-Z1A	\$48.87	\$65.86	\$82.85	H H H H H H D Y
Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HW140-Z1B	\$47.92	\$64.44	\$80.95	H H H H H H D Y
Level D Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW140-Z1D	\$46.62	\$62.49	\$78.35	H H H H H H D Y
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW140-Z1DCL	\$46.37	\$62.11	\$77.85	H H H H H H D Y
Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads 220' or longer					
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HW220-Z1A	\$49.17	\$66.31	\$83.45	H H H H H H D Y
Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HW220-Z1B	\$48.22	\$64.89	\$81.55	H H H H H H D Y
Level D Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW220-Z1D	\$46.92	\$62.94	\$78.95	H H H H H H D Y
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW220-Z1DCL	\$46.67	\$62.56	\$78.45	H H H H H H D Y
Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, and Concrete Pump with Boom Operator					
Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1D	\$44.94	\$59.97	\$74.99	H H H H H H D Y

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with boom					
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1DCL	\$44.07	\$58.66	\$73.25	H H H H H H H D Y
Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with booms					
Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWRC-Z1B	\$46.24	\$61.92	\$77.59	H H H H H H H D Y
Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operators and Concrete Pump with booms					
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWRC-Z1A	\$47.19	\$63.34	\$79.49	H H H H H H H D Y
Operating Engineer Steel Work					
Crane w/ 120' boom or longer	EN-324-SW120	\$51.51	\$69.80	\$88.08	H H D H H H D D Y
Crane w/ 120' boom or longer w/ Oiler	EN-324-SW120-O	\$52.51	\$71.30	\$90.08	H H D H H H D D Y
Crane w/ 140' boom or longer	EN-324-SW140	\$52.69	\$71.57	\$90.44	H H D H H H D D Y
Crane w/ 140' boom or longer W/ Oiler	EN-324-SW140-O	\$53.69	\$73.07	\$92.44	H H D H H H D D Y
Boom & Jib 220' or longer	EN-324-SW220	\$52.96	\$71.97	\$90.98	H H D H H H D D Y
Crane w/ 220' boom or longer w/ Oiler	EN-324-SW220-O	\$53.96	\$73.47	\$92.98	H H D H H H D D Y
Boom & Jib 300' or longer	EN-324-SW300	\$54.46	\$74.22	\$93.98	H H D H H H D D Y
Crane w/ 300' boom or longer w/ Oiler	EN-324-SW300-O	\$55.46	\$75.72	\$95.98	H H D H H H D D Y
Boom & Jib 400' or longer	EN-324-SW400	\$55.96	\$76.47	\$96.98	H H D H H H D D Y
Crane w/ 400' boom or longer w/ Oiler	EN-324-SW400-O	\$56.96	\$77.97	\$98.98	H H D H H H D D Y

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane Operator & Job Mechanic	EN-324-SWCO	\$51.15	\$69.26	\$87.36	H H D H H H D D Y
	Apprentice Rates:				
	0-999 hours	\$40.04	\$52.72	\$65.39	
	1,000-1,999 hours	\$41.85	\$55.43	\$69.01	
	2,000-2,999 hours	\$43.66	\$58.14	\$72.63	
	3,000-3,999 hours	\$45.48	\$60.88	\$76.27	
	4,000-4,999 hours	\$47.28	\$63.58	\$79.87	
	5,000 hours	\$49.10	\$66.31	\$83.51	
Crane w/ Oiler	EN-324-SWCO-O	\$52.15	\$70.76	\$89.36	H H D H H H D D Y
Compressor or Welder Operator	EN-324-SWCW	\$43.70	\$58.08	\$72.46	H H D H H H D D Y
Hoisting Operator	EN-324-SWHO	\$50.51	\$68.30	\$86.08	H H D H H H D D Y
Oiler	EN-324-SWO	\$42.29	\$55.97	\$69.64	H H D H H H D D Y
Tower Crane & Derrick where work is 50' or more above first level	EN-324-SWTD50	\$52.24	\$70.89	\$89.54	H H D H H H D D Y
Tower Crane & Derrick 50' or more w/ Oiler where work station is 50' or more above first level	EN-324-SWTD50-O	\$53.24	\$72.39	\$91.54	H H D H H H D D Y
Operating Engineer Underground					
Class I Equipment	EN-324A1-UC1	\$43.72	\$58.11	\$72.50	H H H H H H D Y
	Apprentice Rates:				
	0-999 hours	\$34.89	\$44.97	\$55.04	
	1,000-1,999 hours	\$36.33	\$47.13	\$57.92	
	2,000-2,999 hours	\$37.76	\$49.27	\$60.78	
	3,000-3,999 hours	\$39.21	\$51.45	\$63.68	
	4,000-4,999 hours	\$40.65	\$53.61	\$66.56	
	5,000-5,999 hours	\$42.09	\$55.77	\$69.44	
Class II Equipment	EN-324A1-UC2	\$38.99	\$51.02	\$63.04	H H H H H H D Y
Class III Equipment	EN-324A1-UC3	\$38.26	\$48.40	\$58.54	H H H H H H D Y
Class IV Equipment	EN-324A1-UC4	\$37.69	\$49.07	\$60.44	H H H H H H D Y
Master Mechanic	EN-324A1-UMM	\$43.97	\$58.49	\$73.00	H H H H H H D Y

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Classification		Straight	Time and	Double	Overtime Provision
Name	Description	Hourly	a Half	Time	
Painter					
Painter	(8 hours of repaint work performed on Sunday shall be paid time & one half rate)	\$38.01	\$50.24	\$62.47	H H D H D D D D N
	Apprentice Rates:				
	First 6 months	\$25.78	\$31.89	\$38.01	
	Second 6 months	\$29.45	\$37.40	\$45.35	
	Third 6 months	\$30.67	\$39.23	\$47.79	
	Fourth 6 months	\$31.89	\$41.06	\$50.23	
	Fifth 6 months	\$33.12	\$42.91	\$52.69	
	Final 6 months	\$34.34	\$44.73	\$55.13	
Sandblasting & spraywork performed, on highway bridges, overpasses, tanks or steel, OR spraywork & sandblasting done with a scaffold height of 40' above the floor level	PT-22-S	\$38.81	\$51.44	\$64.07	H H D H D D D D N
Pipefitter					
Pipefitter	PF-636	\$51.46	\$66.44	\$81.41	H H D H D D D D N
	Apprentice Rates:				
	1st & 2nd periods	\$26.23	\$33.23	\$40.23	
	3rd period	\$28.23	\$36.23	\$44.23	
	4th period	\$29.48	\$38.11	\$46.73	
	5th period	\$30.73	\$39.98	\$49.23	
	6th period	\$31.98	\$41.85	\$51.73	
	7th period	\$33.23	\$43.73	\$54.23	
	8th period	\$34.23	\$45.23	\$56.23	
	9th period	\$35.23	\$46.73	\$58.23	
	10th period	\$36.66	\$48.87	\$61.09	
Plasterer					
Plasterer	BR1P	\$41.92	\$62.88	\$83.84	H H H H H H D N
	Apprentice Rates:				
	1st 6 months	\$21.61	\$32.41	\$43.22	
	2nd 6 months	\$25.00	\$37.50	\$50.00	
	3rd 6 months	\$28.39	\$42.59	\$56.78	
	4th 6 months	\$31.83	\$47.75	\$63.66	
	5th 6 months	\$35.16	\$50.94	\$67.92	
	6th 6 months	\$38.53	\$57.80	\$77.06	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Plasterer	PL67	\$38.32	\$52.78	\$67.24	H H H X D D D D N
	Apprentice Rates:				
	1st 6 months	\$20.97	\$26.76	\$32.54	
	2nd 6 months	\$23.86	\$31.09	\$38.32	
	3rd 6 months	\$26.75	\$35.42	\$44.10	
	4th 6 months	\$29.64	\$39.76	\$49.88	
	5th 6 months	\$32.54	\$44.11	\$55.68	
	6th 6 months	\$35.43	\$48.44	\$61.46	
Plumber					
Plumber	PL-98	\$51.88	\$68.40	\$84.91	H H D H D D D D Y
	Apprentice Rates:				
	Period 1	\$17.11	\$23.41	\$29.71	
	Period 2	\$17.11	\$23.41	\$29.71	
	Period 3	\$26.78	\$35.13	\$43.47	
	Period 4	\$27.41	\$36.07	\$44.73	
	Period 5	\$28.57	\$37.81	\$47.05	
	Period 6	\$29.72	\$39.53	\$49.35	
	Period 7	\$30.87	\$41.26	\$51.65	
	Period 8	\$32.04	\$43.01	\$53.99	
	Period 9	\$33.19	\$44.74	\$56.29	
	Period 10	\$34.35	\$46.48	\$58.61	
Roofer					
Commercial Roofer	RO-149-WOM	\$45.01	\$58.72	\$72.42	H H D H H H D D N
Straight time is not to exceed ten (10) hours per day or forty (40) hours per week.					
	Apprentice Rates:				
	Apprentice 1	\$29.78	\$36.88	\$44.64	
	Apprentice 2	\$33.80	\$41.54	\$49.52	
	Apprentice 3	\$35.16	\$43.50	\$52.14	
	Apprentice 4	\$36.15	\$44.94	\$54.06	
	Apprentice 5	\$37.33	\$46.64	\$56.32	
	Apprentice 6	\$38.67	\$48.58	\$58.90	
Sheet Metal Worker					
Sheet Metal Worker	SHM-80	\$51.82	\$69.04	\$86.25	H H D H D D D D Y
	Apprentice Rates:				
	First Year	\$34.61	\$43.22	\$51.83	
	Second Year	\$35.98	\$45.27	\$54.57	
	Third Year	\$37.36	\$47.34	\$57.33	
	Fourth Year	\$40.11	\$51.47	\$62.83	
	Fifth Year	\$42.86	\$55.59	\$68.33	

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Siding & Decking	SHM-80-SD	\$34.58	\$46.03	\$57.48	H H H H H H D Y
Sound & Communication					
Installer/Technician	EC-58-SC	\$29.33	\$41.30	\$53.26	H H H H H H D N
	Apprentice Rates:				
	Period 1	\$17.16	\$23.04	\$28.93	
	Period 2	\$18.38	\$24.88	\$31.37	
	Period 3	\$19.59	\$26.69	\$33.79	
	Period 4	\$20.81	\$28.53	\$36.23	
	Period 5	\$22.02	\$30.33	\$38.65	
	Period 6	\$23.24	\$32.17	\$41.09	
Sprinkler Fitter					
Sprinkler Fitter	SP 704	\$54.02	\$72.89	\$91.75	H H D H D D D D Y
	Apprentice Rates:				
	1st Period	\$31.38	\$38.93	\$46.47	
	2nd Period	\$33.27	\$41.76	\$50.25	
	3rd Period	\$35.15	\$44.58	\$54.01	
	4th Period	\$37.04	\$47.41	\$57.79	
	5th Period	\$38.93	\$50.25	\$61.57	
	6th Period	\$40.81	\$53.07	\$65.33	
	7th Period	\$42.70	\$55.91	\$69.11	
	8th Period	\$44.59	\$58.74	\$72.89	
	9th Period	\$46.47	\$61.56	\$76.65	
	10th Period	\$48.36	\$64.39	\$80.43	
Terrazzo					
Terrazzo Finisher	TT32-TRF	\$38.77	\$49.06	\$59.34	H H D H D D D D N
	Apprentice Rates:				
	Level 1	\$19.72	\$25.71	\$31.69	
	Level 2	\$20.39	\$26.71	\$33.03	
	Level 3	\$23.86	\$30.27	\$36.69	
	Level 4	\$25.16	\$32.23	\$39.29	
	Level 5	\$26.49	\$33.74	\$41.00	
	Level 6	\$27.92	\$35.33	\$42.74	
	Level 7	\$29.41	\$37.18	\$44.96	
	Level 8	\$30.73	\$38.74	\$46.76	

Official Request #: 187
 Requestor: TROY SCHOOL DISTRICT
 Project Description: CONCESSION REMODELING
 Project Number: ATHENS HIGH SCHOOL
 County: Oakland

Official Rate Schedule

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Official 2007 Prevailing Wage Rates for State Funded Projects

Issue Date: 2/13/2007

Contract must be awarded by 5/14/2007

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Terrazzo Worker	TT32-TRW	\$43.79	\$56.59	\$69.38	H H D H D D D D N
	Apprentice Rates:				
	Level 1	\$24.11	\$30.98	\$37.86	
	Level 2	\$26.83	\$34.42	\$42.00	
	Level 3	\$29.60	\$37.44	\$45.28	
	Level 4	\$32.00	\$40.68	\$49.36	
	Level 5	\$34.08	\$43.15	\$52.21	
	Level 6	\$37.34	\$47.85	\$58.35	
	Level 7	\$38.42	\$49.33	\$60.25	
	Level 8	\$39.25	\$50.58	\$61.91	
Tile					
Tile Finisher	TT32-TF	\$38.39	\$48.49	\$58.58	H H D H D D D D N
	Apprentice Rates:				
	Level 1	\$18.63	\$24.07	\$29.51	
	Level 2	\$19.69	\$25.66	\$31.63	
	Level 3	\$23.83	\$30.23	\$36.63	
	Level 4	\$25.13	\$32.18	\$39.23	
	Level 5	\$26.46	\$33.70	\$40.94	
	Level 6	\$27.89	\$35.48	\$43.08	
	Level 7	\$29.38	\$37.01	\$44.65	
	Level 8	\$30.70	\$38.57	\$46.45	
Tile Layer	TT32-TL	\$43.69	\$56.44	\$69.18	H H D H D D D D N
	Apprentice Rates:				
	Level 1	\$24.11	\$30.98	\$37.86	
	Level 2	\$26.83	\$34.42	\$42.00	
	Level 3	\$29.60	\$37.44	\$45.28	
	Level 4	\$32.00	\$40.68	\$49.36	
	Level 5	\$34.03	\$42.94	\$51.86	
	Level 6	\$37.29	\$47.77	\$58.25	
	Level 7	\$37.87	\$48.51	\$59.15	
	Level 8	\$38.70	\$49.75	\$60.81	
Truck Driver					
on all trucks of 8 cubic yard capacity or less	TM-RB1	\$33.66	\$35.99		H H H H H H H H Y
of all trucks of 8 cubic yard capacity or over	TM-RB1A	\$33.76	\$36.14		H H H H H H H H Y
on euclid type equipment	TM-RB1B	\$33.91	\$36.36		H H H H H H H H Y

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Underground Laborer Open Cut, Class I					
Construction Laborer	LAUC-Z1-1	\$32.39	\$42.99	\$53.58	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.59	\$35.78	\$43.98	
	1,001-2,000 work hours	\$28.55	\$37.22	\$45.90	
	2,001-3,000 work hours	\$29.51	\$38.66	\$47.82	
	3,001-4,000 work hours	\$31.43	\$41.54	\$51.66	
 Underground Laborer Open Cut, Class II					
Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.	LAUC-Z1-2	\$32.50	\$43.15	\$53.80	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.68	\$35.92	\$44.16	
	1,001-2,000 work hours	\$28.64	\$37.36	\$46.08	
	2,001-3,000 work hours	\$29.60	\$38.80	\$48.00	
	3,001-4,000 work hours	\$31.54	\$41.71	\$51.88	
 Underground Laborer Open Cut, Class III					
Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodder, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars, etc.), cement finisher, welder, pipe jacking and boring man, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tugger man, and directional boring man.	LAUC-Z1-3	\$32.55	\$43.23	\$53.90	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.71	\$35.96	\$44.22	
	1,001-2,000 work hours	\$28.68	\$37.42	\$46.16	
	2,001-3,000 work hours	\$29.65	\$38.88	\$48.10	
	3,001-4,000 work hours	\$31.58	\$41.77	\$51.96	
 Underground Laborer Open Cut, Class IV					
Trench or excavating grade man.	LAUC-Z1-4	\$32.63	\$43.35	\$54.06	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.77	\$36.06	\$44.34	
	1,001-2,000 work hours	\$28.74	\$37.51	\$46.28	
	2,001-3,000 work hours	\$29.72	\$38.98	\$48.24	
	3,001-4,000 work hours	\$31.66	\$41.89	\$52.12	

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Classification Name Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Underground Laborer Open Cut, Class V					
Pipe Layer	LAUC-Z1-5	\$32.69	\$43.44	\$54.18	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$27.82	\$36.13	\$44.44	
	1,001-2,000 work hours	\$28.79	\$37.58	\$46.38	
	2,001-3,000 work hours	\$29.77	\$39.06	\$48.34	
	3,001-4,000 work hours	\$31.72	\$41.98	\$52.24	
 Underground Laborer Open Cut, Class VI					
Grouting man, top man assistant, audio visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work.	LAUC-Z1-6	\$30.14	\$39.61	\$49.08	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$25.90	\$33.25	\$40.60	
	1,001-2,000 work hours	\$26.75	\$34.52	\$42.30	
	2,001-3,000 work hours	\$27.60	\$35.80	\$44.00	
	3,001-4,000 work hours	\$29.29	\$38.34	\$47.38	
 Underground Laborer Open Cut, Class VII					
Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes, flagstones etc.	LAUC-Z1-7	\$26.76	\$34.54	\$42.32	H H H H H H D Y
Apprentice Rates:					
	0-1,000 work hours	\$23.37	\$29.46	\$35.54	
	1,001-2,000 work hours	\$24.05	\$30.48	\$36.90	
	2,001-3,000 work hours	\$24.73	\$31.50	\$38.26	
	3,001-4,000 work hours	\$26.08	\$33.52	\$40.96	

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MICHIGAN DEPARTMENT OF LABOR & ECONOMIC GROWTH
WAGE & HOUR DIVISION

OVERTIME PROVISIONS for MICHIGAN PREVAILING WAGE RATE SCHEDULE

1. Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

	Monday thru Friday	Saturday	Sunday & Holidays
First 8 Hours		4	8
9th Hour	1	5	
10th Hour	2	6	
Over 10 hours	3	7	

Overtime for Monday thru Friday after 8 hours:

- the 1st character is for time worked in the 9th hour (8.1 - 9 hours)
- the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)
- the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

Overtime on Saturday:

- the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)
- the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)
- the 6th character is for time worked in the 10th hour (9.1 - 10 hours)
- the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

Overtime on Sundays & Holidays

The 8th character is for time worked on Sunday or on a holiday

The last character indicates if an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked.

2. Overtime Indicators Used in the Overtime Provision:

- H - means TIME AND ONE-HALF due
- X - means TIME AND ONE-HALF due after 40 HOURS worked
- D - means DOUBLE PAY due
- Y - means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked
- N - means NO an optional 4-day 10-hour per day workweek *can not* be worked without paying overtime after 8 hours worked

3. EXAMPLES:

HHHHHHHDN - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (characters 1 - 3); for all hours worked on Saturday, 1½ rate is due (characters 4 - 7). Work done on Sundays or holidays must be paid double time (character 8). The N (character 9) indicates that 4 ten-hour days is not an acceptable workweek at regular pay.

XXXHHHHDY - This example shows that the 1½ rate must be used for time worked after 40 hours are worked Monday thru Friday (characters 1-3); for hours worked on Saturday, 1½ rate is due (characters 4 - 7). Work done on Sundays or holidays must be paid double time (character 8). The Y (character 9) indicates that 4 ten-hour days is an acceptable alternative workweek.

ENGINEERS - CLASSES OF EQUIPMENT LIST

UNDERGROUND ENGINEERS

CLASS I

Backfiller Tamper, Backhoe, Batch Plant Operator, Clam-Shell, Concrete Paver (2 drums or larger), Conveyor Loader (Euclid type), Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, End Loader, Gradall (and similar type machine), Grader, Power Shovel, Roller (asphalt), Scraper (self propelled or tractor drawn), Side Broom Tractor (type D-4 or larger), Slope Paver, Trencher (over 8' digging capacity), Well Drilling Rig, Mechanic, Slip Form Paver.

CLASS II

Boom Truck (power swing type boom), Crusher, Hoist, Pump (1 or more 6" discharge or larger gas or diesel powered by generator of 300 amps or more, inclusive of generator), Side Boom Tractor (smaller than type D-4 or equivalent), Sweeper (Wayne type and similar equipment), Tractor (pneu-tired, other than backhoe or front end loader), Trencher (8' digging capacity and smaller).

CLASS III

Air Compressors (600 cfm or larger), Air Compressors (2 or more less than 600 cfm), Boom Truck (non-swinging, non-powered type boom), Concrete Breaker (self-propelled or truck mounted, includes compressor), Concrete Paver (1 drum, ½ yard or larger), Elevator (other than passenger), Maintenance Man, Mechanic Helper, Pump (2 or more 4" up to 6" discharge, gas or diesel powered, excluding submersible pump), Pumpcrete Machine (and similar equipment), Wagon Drill Machine, Welding Machine or Generator (2 or more 300 amp or larger, gas or diesel powered).

CLASS IV

Boiler, Concrete Saw (40HP or over), Curing Machine (self-propelled), Farm Tractor (w/attachment), Finishing Machine (concrete), Firemen, Hydraulic Pipe Pushing Machine, Mulching Equipment, Oiler (2 or more up to 4", exclude submersible), Pumps (2 or more up to 4" discharge if used 3 hrs or more a day-gas or diesel powered, excluding submersible pumps), Roller (other than asphalt), Stump Remover, Vibrating Compaction Equipment (6' wide or over), Trencher (service).

HAZARDOUS WASTE ABATEMENT ENGINEERS

CLASS I

Backhoe, Batch Plant Operator, Clamshell, Concrete Breaker when attached to hoe, Concrete Cleaning Decontamination Machine Operator, Concrete Pump, Concrete Paver, Crusher, Dozer, Elevating Grader, Endloader, Farm Tractor (90 h.p. and higher), Gradall, Grader, Heavy Equipment Robotics Operator, Loader, Pug Mill, Pumpcrete Machines, Pump Trucks, Roller, Scraper (self-propelled or tractor drawn), Side Boom Tractor, Slip Form Paver, Slop Paver, Trencher, Ultra High Pressure Waterjet Cutting Tool System Operator, Vactors, Vacuum Blasting Machine Operator, Vertical Lifting Hoist, Vibrating Compaction Equipment (self-propelled), and Well Drilling Rig.

CLASS II

Air Compressor, Concrete Breaker when not attached to hoe, Elevator, End Dumps, Equipment Decontamination Operator, Farm Tractor (less than 90 h.p.), Forklift, Generator, Heater, Mulcher, Pigs (Portable Reagent Storage Tanks), Power Screens, Pumps (water), Stationary Compressed Air Plant, Sweeper, and Welding Machine.

Regular Crane Operators rate shall include: Mechanics, Crane Operators, Dragline Operators, Boom Truck Operators, Power Shovel Operators and Concrete Pumps with booms.

Revised: 09/07/06

**SECTION 00880
REGULATORY REQUIREMENTS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to all applicable building codes, laws, regulations, permits, fees, notices, Equal Employment Opportunity, wage rates, non-segregated facilities and other statutory requirements for the Project.

1.02 STANDARDS, CODES AND REGULATION

- A. All Work is to comply with the rules and regulations of governing bodies having jurisdiction.
- B. Standards, codes and regulations published by Manufacturer's associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and legal requirements in force.
- C. Where differences occur between the Contract Documents and such standards, the strictest requirements shall take precedence.
- D. Supply all materials and perform all Work in accordance with the Manufacturer's specifications and installation procedures, and in conformance with published Trade and Manufacturers' association standards, unless specifically noted otherwise in the Contract Documents.
- E. **Contractor** shall comply with all applicable requirements of both state and federal Laws regarding discovery, release, transportation, storage, spills, disposal or other handling of Hazardous Materials Refer to Section 00840 in the Project Manual.

1.03 PERMITS

- A. Refer to Section 00890 Permits in the Project Manual.

1.04 TAXES

- A. Except to the extent specifically described below, this Project is subject to all applicable state Sales Tax and/or Use taxes, and Bidder must include such taxes in its Bid Proposal. All other taxes applicable to the project at the time of the bid are to be included in the bid amount and will be the responsibility of Bidder.

END OF SECTION 00880

**SECTION 00890
PERMITS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 PERMITS AND FEES

- A. Troy School District **will** obtain and pay for the General Building Permit.
- B. Other than the general building permit, **Contractor** shall provide and pay for all other permits, assessments, governmental fees, bonds, connection charges, licenses and inspection fees and any other charges necessary for the proper execution and completion of the **Contractor's** Work.
- C. **Contractor** is to provide, pay for and coordinate all other permits, fees, inspections, and city, county, state, federal and governing authority approvals required for the successful completion of the Work contained within its respective Bid Category and deliver required certificates of inspection and approvals to Barton Malow Company.
- D. This Project is under the jurisdiction of the **MICHIGAN DEPARTMENT OF LABOR FOR MECHANICAL AND ELECTRICAL, STATE OF MICHIGAN FIRE MARSHAL DIVISION, MICHIGAN DEPARTMENT AND OAKLAND COUNTY DEPARTMENT OF PUBLIC HEALTH.**
- E. Site water and sewer utilities are under the jurisdiction of the **ROAD COMMISION OF OAKLAND COUNTY** authorities.

END OF SECTION 00890

**SECTION 01140
USE OF PREMISES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
1. Use of Premises and Deliveries
 2. Use of Existing Elevators
 3. Use of Existing Facilities
 4. Existing Entrances and Drives
 5. Protection of Underground Facilities
 6. No Interruption of Occupancy/Sequencing
 7. Material Storage

PART 2 - USE OF PREMISES

2.01 USE OF PREMISES AND DELIVERIES

- A. Contractor and its Subordinate Parties shall be subject to such rules and regulations for the conduct of the Work as the Owner or Barton Malow Company may establish. All employees shall be properly and completely clothed while working. Bare torsos, legs and feet will not be allowed. Possession or consumption of alcoholic beverages or drugs, or other obnoxious behavior on the site is strictly prohibited. Violators shall be promptly removed from the site.
- B. Before starting the Work, Contractor shall ascertain from Barton Malow Company what entrances, routes or roadways shall be used for access to the Work, and use only those designated for movement of personnel, materials and vehicles to and from the Project site. Close coordination will be required of Contractor with the Owner, Barton Malow Company, other contractors, the city and others having an interest in the Project to assure that Work on the site, access to and from the site and the general conduct of operations is maintained in a safe and efficient manner, and that disruption and inconvenience to existing streets and property is minimized. Contractor is responsible to review the site and be familiar with all existing conditions within and around the Owner's property including local conditions and requirements. A set of existing drawings, which are considered Resource Drawings, is available for inspection at the Barton Malow Company's Field Office.
- C. Contractors shall maintain free access to all buildings and areas of the site for designated vehicles, service vehicles and fire fighting equipment and at no time shall block off or close roadways or fire lanes without providing auxiliary roadways and means of entrance acceptable to the Owner. Fire hydrants must remain accessible at all times. Contractors shall give the Owner and the local fire department at least forty-eight (48) hours notice of any such changes of routes.
- D. There is on-site parking for Contractors and their Subordinate Parties' employees. Contractor, Subordinate Parties and their personnel will not be allowed to park in the Owner's parking area. Barton Malow Company will designate parking areas.
- E. Contractors and their Subordinate Parties will not be allowed to use any Owner tools or equipment during the course of the Project.

- F. Each Contractor shall confine its Work to normal working hours; 8:00 am to 4:30 p.m. OR 7:00 am to 3:30 p.m., Monday through Friday. Contractor may execute the Work during the entire twenty-four (24) hours of any day of the week with the approval of the Barton Malow Company and the Owner, providing that they so conduct their operations as to not create a public nuisance or disturb the peace, and provided such operations are conducted so as to comply with all applicable laws, ordinances, and regulations. Compensation to Barton Malow Company for supervisory staff due to abnormal working hours will be at the requesting Contractor's expense.
1. The City of Troy has a noise ordinance which states: **The erection (including excavating), demolition, alteration, or repair of any building, the excavation and/or grading of streets, highways, or private property other than between the hours of 7:00am and 8:00pm on Mondays through Saturdays, unless a permit be first obtained from the Building Department for building work or from the Engineering Department for street work (Title IX – Police Regulations).**
 2. **The Troy School District has stated that no construction traffic is allowed to or from the schools between the hours of 7:10am-7:55am and 2:10pm-2:55pm. This is to ensure the safety of their students.**
- G. Whenever Contractor intends to depart from normal work hours, it shall notify Barton Malow Company in writing at least forty-eight (48) hours in advance. Failure of Contractor to give such timely notice may result in Barton Malow Company directing the removal or uncovering of the Work performed during such abnormal hours and Contractor's expense. Special arrangements can be made for emergency work or shutdowns as may be required.
- H. Use of explosives are not permitted.
- I. Each Contractor on behalf of itself and its Subordinate Parties shall be responsible for all damage to the Project including the existing buildings and grounds arising or resulting from its operations under the Agreement. Repair or replacement of damaged items shall be to the satisfaction of the Owner and Barton Malow Company.
- J. Each Contractor shall at all times maintain a clean and safe passageway for the Owner's operations and personnel in existing areas and maintain clearances adjacent to and in connection with the Work performed.
- K. Each Contractor shall effectively confine dust, dirt and noise to the actual construction area and in compliance with all applicable laws, rules and regulations.
- L. All Contractors and their Subordinate Parties shall restrict all Work activities associated with an area undergoing renovation to within the boundaries indicated by the Contract Documents. Any means of access or egress from the stipulated boundaries shall be coordinated with Barton Malow Company and the Owner.
- M. Work shall, if required, be constructed in phases to accommodate the Owner's use of the premises during construction and to accommodate installation of equipment. Refer to Section 00230 Schedule and Phasing of the Project Manual.
- N. All Contractors shall limit their use of the premises for Work and for storage, to allow for:
- * Work by other contractors
 - * Owner occupancy
 - * Public use and safety
 - * Free use of corridors at all times
- O. The Owner and Barton Malow Company expect Contractors and their Subordinate Parties to exercise common sense and good judgment, and to conduct themselves in a manner which would be a credit to the

Owner. Without limiting other applicable provisions of the Contract Documents, Contractor shall not engage in the following:

1. Conduct that interferes with Work or work of others.
2. Conduct that interferes with, or is detrimental to good safety and well being.
3. Unauthorized use of confidential information.
4. Discourtesy toward Owner's staff, visitors and the general public (including abusive, vulgar or other language).
5. Soliciting.
6. Disregard of safety, sanitation, or security laws, rules and regulations.
7. Conduct detrimental to the Owner's operations and good reputation.
8. Stealing.
9. Gambling.
10. Possession and/or use of narcotics or intoxicants.
11. Threats or abuse of others.
12. Disorderly conduct or fighting.
13. Playing of loud music.
14. Falsification of information.
15. Unauthorized travel of Subcontractor's employees outside the designated project Work areas.
16. Discriminating Behavior.
17. Sexual or Ethnic harassment.

Willful disregard of the above will be grounds for requiring the offending person(s) to be removed from the Project, and may subject the Contractor to termination under the Agreement.

- P. Site contractor shall be responsible for keeping the designated route to the site clean and free of debris. Site contractor will assume responsibility for any of their sub-contractors keeping the designated route to the site clean and free of debris.
- P. Each Contractor on behalf of itself and its Subordinate Parties shall not load or permit any part of a structure to be loaded with a weight that will endanger its safety.
- Q. Where new temporary partitions are established and located by the Demolition, Carpentry, or Drywall contractor, all existing mechanical, fire protection, plumbing and electrical devices used for life safety purposes shall be relocated by the Contractor installing or relocating same to the new temporary partitions so as to be usable and visible to Owner personnel and activities. Items such as, but not limited to: exit lights, fire protection systems, fire alarm systems, and similar items shall be relocated. In the event that a passageway is blocked or barricaded, visible rerouting directions for traffic flow shall be posted.
1. The Project is under the jurisdiction of the Michigan Department of Labor and Economic Growth.
 2. Partition construction shall provide a fire-resistant classification approved by the state Fire Marshall. Openings in such partitions shall be protected by fire doors consistent with the rating of the partition.
- R. The Owner shall have the option to curtail or delay any activity that affects its operations. Should a Contractor be asked to stop its Work, the Contractor shall do so immediately and proceed with other activities with no additional cost to the Owner or Barton Malow Company. The Owner may occupy the premises during the entire period of construction for the conduct of its normal operations. All Contractors are to cooperate with the Owner and Barton Malow Company in all construction operations to minimize conflict, and to facilitate Owner usage.
- S. Contractors and their Subordinate Parties are prohibited from canvassing, soliciting, posting, or distributing literature or materials for any purpose while on the job site.
- T. Contractors and their Subordinate Parties shall be responsible for adhering to the smoking policies and regulations of the Owner and the Owner's facilities.

- U. The preservation of existing trees and other vegetation on the site to the maximum extent possible is extremely important. In many cases, trees in close proximity to the site work are to be preserved. Each Contractor must plan its Work and instruct its Subordinate Parties to conduct their operations to avoid damage to trees and vegetation (provide barriers as required). Indiscriminate driving about the site, disposing of waste, storage of materials upon or against trees or any other activity which is harmful to trees or vegetation that are to be preserved will not be tolerated. Parking areas, storage areas, and access to the buildings will be confined to areas designated and approved by Barton Malow Company.
- V. Any case of damage to any tree shall be reported to Barton Malow Company immediately so that professional repairs can be made. The cost of such required repairs or treatment shall be charged to the responsible Contractor. Willful disregard of the above will be grounds for requiring the offending person(s) to be removed from the Project, and may subject the Contractor to termination under the Agreement.

2.02 USE OF EXISTING ELEVATORS

- A. Each Contractor, subject to the approval of Barton Malow Company and Owner may not, use the existing elevator(s) designated by the Owner within the contract boundaries for movement of personnel and materials to a construction area.
- B. In those cases where an elevator is to be shared with Owner services, the Owner's employees and services take priority over construction activities. Each Contractor is responsible for proper conduct of its Subordinate Parties with regard to the use of the elevator. Any damage to the elevator due to oversize load, excess weight or other conditions is the individual Contractor's responsibility.
- C. Use of the elevator(s) at times other than normal working hours shall be coordinated with Barton Malow Company and Owner.

2.03 USE OF EXISTING FACILITIES

- A. Contractors shall limit their and their Subordinate Parties' usage of the occupied areas of the facility to that which is absolutely necessary for the installation of their Work. Parts of the facility not in the construction area are "off limits" unless a specific work task is being performed as designated by Barton Malow Company.
- B. Contractors and their Subordinate Parties will not be allowed the use of the Owner's cafeteria, parking, telephones, toilet facilities, tools, equipment, or any other item or facility belonging to the Owner, unless specifically authorized by Owner and Barton Malow Company. Contractor's Subordinate Parties shall not use the Owner's facilities for personal use such as lunchrooms and similar areas for coffee breaks, clothing changes or similar uses. The Owner's complex shall be off-limits to all construction personnel without prior approval of Barton Malow Company and the Owner.

2.04 EXISTING ENTRANCES AND DRIVES

- A. Contractor and construction delivery access to the worksite shall be as designated by Barton Malow Company. Selected entrances to the Project site will remain open during normal working hours for the use of all Contractors. Contractors shall utilize specific entrances for material deliveries, equipment deliveries and worker access to the Project site as directed by Barton Malow Company.
- B. At no time are ANY vehicles to be parked, whether attended or not, in the Owner's entrances or drives. Any material delivery which will tie up the Owner's entrances or drives in excess of 15 minutes shall be pre-scheduled with the Owner through Barton Malow Company. In scheduling construction deliveries the Contractor agrees that the Owner's deliveries, and operations will take precedence.

2.05 PROTECTION OF UNDERGROUND FACILITIES

- A. Each Contractor shall provide and maintain proper shoring and bracing for existing underground utilities, sewers, and building foundations, encountered during its excavation Work, to protect from collapse or movement, or other type of damage until such time as they are to be removed, incorporated into the new Work or can be properly backfilled upon completion of new Work. All such disruptions of services shall be limited to a maximum of FOUR (4) hours. Prior to beginning any excavation, Contractor shall contact MISS DIG and utility companies for the location of all existing underground services and provide, if requested, documentation of such contact to Barton Malow Company. If necessary, Contractor shall pay for appropriate layout and locating of existing utilities.
- B. Utilities and/or other services which are shown, or not shown but encountered, shall be protected by the Contractor from any damage arising or resulting from Work, unless or until they are abandoned. If the utilities or services are damaged from Contractor's Work Contractor shall immediately repair any damage and restore the utilities and services to an equal or better condition than that which existed prior to the damage. Contractor will be responsible for all liabilities, expenses, lawsuits or claims arising or resulting from such damage and will defend, hold harmless and indemnify Owner and Barton Malow Company from any claims or lawsuits or other expenses.
- C. Each Contractor on behalf of itself and its Subordinate Parties shall be responsible for all damage to the Project including the existing building and grounds arising out of or resulting from their performance of the Work. Repair or replacement of damaged items shall be to the satisfaction of the Owner and Barton Malow Company.

2.06 NO INTERRUPTION OF OCCUPANCY/SEQUENCING

- A. Each Contractor is responsible to plan, coordinate and execute its Work in such a manner that there will be no disruption of the Owner's operations. If an interruption of operations is unavoidable, then this Work will be scheduled with the Owner through the Barton Malow Company prior to beginning such Work.
- B. Due to the nature of the Owner's existing areas, the sequence of Work must be scheduled and coordinated with the Owner's ongoing operations to minimize disruptions and/or disturbances to the Owner's Work and at all times remain as secondary to the Owner's operations. Each segment of the Work shall be coordinated with the Barton Malow Company and the Owner prior to proceeding.
- C. Work that interrupts the Owner's services will be accomplished during the time periods when it is least inconvenient to the Owner and completed in the shortest possible time frame. Contractors may be requested to work split shifts, weekends, off peak Owner loading periods, etc., to accommodate Owner's utility and service requirements, such as, but not limited to, medical gas systems, electrical power, HVAC systems, storm and sanitary lines. The cost for premium time labor, which may be required, is the Contractor's responsibility and is to be included in the base bid.
- D. Contractors are responsible to provide any temporary alternate supply and/or return conditions to maintain services to the facility while Work is being performed for each Bid Category. Place safety stages or markers to indicate location of disconnected services.
- E. No interruptions to Owner's power, lighting, signal, or alarm circuits will be permitted without the express written permission of the Owner. Arrangements for interruptions shall be made with the Owner at least forty-eight (48) hours prior to the interruption and shall be made at such time and duration as authorized by them. Temporary feeders, transformer jumpers, connections, circuits, etc., shall be used as required to accomplish the above at no additional cost to the Owner and Barton Malow Company.
- F. Contractors shall construct the Work in stages to provide for public convenience. Contractors shall not close off public use of facilities until completion of one stage of construction will provide alternative usage, or until other means have been provided.
- G. These provisions shall apply to all Contractors and are applicable whether a Contractor is either directly or indirectly affected.

2.07 MATERIAL STORAGE

- A. Each Contractor shall provide suitable storage trailers on site as required. These are to be relocated and removed when directed by Barton Malow Company.
- B. Temporary storage of materials in the building and on the site will be limited to the same areas immediately under construction for materials intended for that particular portion of the Work. Material, equipment and tools shall not be stored on site in excess of five (5) working days prior to installation or use without Barton Malow Company's approval. Contractors shall stock the job with sufficient materials to maintain progress and schedule and without interfering with the Work or storage of others. Each Contractor assumes full responsibility for the protection and safekeeping of products under its control which are stored on the site. Contractors must move any stored products, under their control, which interfere with operations of the Owner or separate contractors as directed by Barton Malow Company. All Contractors are to cooperate with Barton Malow Company and other contractors in this regard.
- C. Each Contractor shall provide sufficient protection for its materials and equipment from damages by weather or construction work or other hazards.
- D. During progress of Work and upon completion of the Work, Contractor shall remove all debris and leave the area in a clean and orderly condition.
- E. Each Contractor shall submit a receipt of shipment for all equipment stored on site or off-site to the Barton Malow Company. No materials or equipment shall be removed from the site without the permission of Barton Malow Company.
- F. Storage of combustible materials within or adjacent to the building is prohibited.

END OF SECTION 01140

**SECTION 01210
ALLOWANCES**

The following is a list of the allowances for the Troy School District Athens High School Concessions' Remodeling BP #9393 project, as taken from the work scopes (section 00220).

WORK SCOPE SECTION	DESCRIPTION	AMOUNT
6.2 – General Trades	For miscellaneous items. Allowance to be used on a time and material basis as directed by BMC.	\$2,500
15.1 – Mechanical	-	-
16.1 – Electrical	For miscellaneous items. Allowance to be used on a time and material basis as directed by BMC.	\$2,500

END OF SECTION 01210

**SECTION 01250
CHANGES IN THE WORK**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Various forms of field communications will be used to document communication between the **Contractor** and Barton Malow Company as described in Section 01320 Communications. Field Communications are interpreted to be within the scope of the Agreement and as such are not authorizations for Work beyond the scope of the Agreement.

1.02 SUMMARY

- A. This section identifies an effective method of identification of changed work and provides an efficient method of modification of Contract Documents.
- B. This section describes the following requirements including:
 - 1. Types of Change Documentation
 - 2. Compensation of Overhead and Profit for Changes in the Work
 - 3. Itemization of Cost of Changed Work

PART 2 - TYPES OF CHANGE DOCUMENTATION

2.01 ARCHITECT INSTRUCTIONS

- A. There are two forms of Architect Instructions used on the Project, namely the Architect's Supplemental Instruction ("ASI"), AIA Document G710, and the Proposal Request ("PR"), AIA Document G709. These documents will be issued by the Architect and distributed by the Barton Malow Company to affected Contractors.
 - 1. ASI's are used by the Architect to issue supplemental instructions or interpretations involving minor changes in the Work that will not affect the contract price or schedule.
 - 2. PRs, often termed "Bulletins" are used by the Architect to identify changes in the Contract Documents which may affect the Contractor's contract price or schedule. An itemized write-up narrative and corresponding "bubbled" change on the drawings or specifications usually accompanies this document.
- B. PRs or "Bulletins" sent to Contractors which may involve a change in the contract price or schedule will be accompanied by the Barton Malow form entitled "PCO- Quotation Only". In the event that the timing does not allow the For Quote Only process, then Barton Malow Company will issue its form entitled "PCO - Notice to Proceed" to the Contractor.

2.02 PCO- NOTICE TO PROCEED AND FOR PCO- QUOTATION ONLY FORMS

- A. A PCO- Notice to Proceed is used when Work must be performed with swiftness and authorization to proceed by Change Order is inappropriate due to time restrictions. A PCO-Notice to Proceed may be issued for changes in schedule or contract price. In order for a PCO- Notice to Proceed to be valid, it must be signed by Barton Malow Company and Owner. The terms for establishing the additional cost and processing of the PCO- Notice to Proceed into a Change Order shall be identified prior to its release by Barton Malow Company.

- B. If a change issued by the Architect, through Barton Malow Company, may result in an additional cost to the Contractor, Barton Malow Company will issue a PCO- Quotation Only with the Architect's documents. The PCO- Quotation Only will describe the change or reference the appropriate documents and will have attached the detailed descriptions, sketches and plans required for the Contractor to quote the change.
- C. Barton Malow Company will send the PCO- Quotation Only to all potentially affected Contractors.
- D. Once the Contractor receives the PCO- Quotation Only or the PCO- Notice to Proceed, it shall prepare a detailed cost estimate for the change. This estimate shall include an itemized takeoff of labor, equipment and material with a unit cost for each item. Under no circumstances will a PCO- Quotation Only or a PCO- Notice to Proceed be processed unless accompanied by a complete cost breakdown. The PCO- Quotation Only must be returned no later than the date indicated on the PCO- Quotation Only or at the direction of Barton Malow Company.
- E. Once completed, the Contractor shall sign and date the PCO- Quotation Only and submit it with proper backup to Barton Malow Company. Barton Malow Company will then review, evaluate, possibly negotiate and then when acceptable, process the PCO- Quotation Only through the Owner's Representative and Architect's Representative. Once the quote for the work under the PCO- Notice to Proceed is submitted to Barton Malow Company, it will review, evaluate, possibly negotiate, and then, when acceptable, process the resulting Change Order through Owner's Representative and Architect's Representative.
- F. The PCO- Quotation Only is a document used for processing Contractor's quotations and is not a Change Order. Therefore, completion of the PCO- Quotation Only does **not** release the Work to begin.
- G. PCO- Quotation Only and the PCO- Notice to Proceed will precede a Change Order. Contractors shall receive an approved PCO- Notice to Proceed or an executed Change Order before starting Work. Any changed Work performed by Contractor without a properly executed PCO- Notice to Proceed or a properly executed Change Order is at Contractor's sole risk and expense. BILLINGS AGAINST CHANGES WILL NOT BE ACCEPTED AFTER A PCO- NOTICE TO PROCEED OR FOR QUOTE ONLY IS ISSUED, BUT ONLY AFTER A CHANGE ORDER HAS BEEN PROCESSED AND SIGNED BY ALL PARTIES.

2.04 CHANGE ORDER

- A. Change Orders will be written and issued by Barton Malow Company. Barton Malow Company will first issue the Change Order to the Contractor for signature. The Change Order will then be returned to Barton Malow Company. Once all appropriate signatures are secured, an executed copy will be sent to the Contractor.
- B. Once the Change Order has been processed and signed by all parties, the Contractor. may invoice for payment on the completed portion of Work.
- C. Agreement on any Change Order, shall constitute a final settlement of all matters relating to the changed Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change, any impact such change may have on the unchanged Work, including but not limited to claims for acceleration, stacking, inefficiency, ripple effect, disruption, compression, interference, delay and cumulative impact, and any and all adjustments to the contract price and the schedule.

PART 3 - COMPENSATION OF OVERHEAD AND PROFIT FOR CHANGES IN THE WORK

3.01 CONTRACTOR’S OVERHEAD AND PROFIT

- A. When changed Work is performed by a Contractor itself and not by its Subordinate Party, the Contractor’s charge for overhead and profit shall in no event exceed fifteen percent (15%) of the approved cost of the changed Work. When changed Work is performed by a Contractor’s Subordinate Party, the Contractor’s charge for overhead and profit shall in no event exceed five percent (5%) of the approved cost of the changed Work.
- B. When changed Work is performed by the Contractor’s Subordinate Party, the Subordinate Party’s charge for overhead and profit shall in no event exceed fifteen percent (15%) of the approved cost of the changed Work when such Work does not involve the Subordinate Party’s subcontractors; or five percent (5%) of the approved cost of the changed Work when such changed Work is performed by the Subordinate Party’s subcontractors.
- C. Contractor and Subordinate Party overhead and profit shall include cost (at the Project Site, home office and otherwise) of supervision, telephone, travel, copying, administrative services, office, power, light, tools, jobsite vehicles, and all other general expenses including bond premiums. In no event shall these be charged as cost of the Changed Work.

PART 4 - ITEMIZATION OF COST OF CHANGED WORK

4.01 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. **Contractors** shall revise the Schedule of Values and Request for Payment forms to record each Change Order as a separate item of Work, and to record the adjusted contract price.
- B. **Contractors** shall revise the Construction Schedule to reflect each change in Contract Time approved by a Change Order.
 - 1. **Contractor’s** shall revise sub-schedules to show changes for other items of Work affected by the changes.
- C. Upon completion of Work under a Change Order, enter pertinent changes in Record Documents (Refer to Section 01720 – Project Record Documents).

4.02 COST OF THE CHANGED WORK

- A. The "Cost of the Changed Work" shall be approved by the Barton Malow Company and shall mean the costs necessarily incurred by the **Contractor** in the proper performance of the Changed Work Such rates shall not be higher than those customarily paid at the place of the Project. The Cost of the Changed Work shall only include those items set forth below.

<u>WAGES OF LABOR</u>	Wages of construction workers directly employed by Contractor to perform the construction of the changed Work at the site
<u>PAYROLL MARKUP</u>	The amount approved by Barton Malow Company and Owner which covers the costs paid by the Contractor for taxes, insurance, contributions, assessments, and benefits required by law or collective bargaining

	agreements and for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays vacations and pensions, provided that such costs are based on the wages and salaries of labor performing the changed Work.
COST OF EQUIPMENT, MATERIALS, AND SUPPLIES	Costs of materials, equipment and supplies to be incorporated into the changed Work less all savings, discounts, rebates and credits accruing to the Contractor .
RENTAL CHARGES FOR EQUIPMENT NOT OWNED BY CONTRACTOR	Rental charges for equipment not owned by Contractor that is necessary for completion of the Changed Work. Rates and quantities rented must be approved in advance by Barton Malow Company.
TAXES	Sales or use taxes imposed by a governmental authority which are directly attributed to the changed Work and for which the Contractor is liable.
SUBCONTRACTOR COSTS	Payments made to the Subcontractors for proper execution of Changed Work, subject to the limits set forth in Subparagraph 3.01 B. above for overhead and profit.

B. In no event shall the Cost of Changed Work include:

1. Salaries or wages of persons other than those directly performing the changed Work, including **Contractor's** personnel stationed at the principal office;
2. Expenses of the **Contractor's** principal office and offices other than the site office, except as provided in section 3.01 A. above;
3. Overhead and general expenses of any nature, except as set forth in sections 3.01 A and 3.01 B.;
4. Capital expenses of **Contractor**, including interest on the **Contractor's** capital employed for the Changed Work;
5. Rental costs for machinery or equipment, except as allowed under section 4.02 A above, or tools of any kind, unless specifically identified and approved in advance in writing by Barton Malow Company;
6. Costs due to the negligence or failure to perform of the **Contractor** or its Subordinate Parties;
7. Costs designated in section 3.01 C as being included in Overhead and Profit; or
8. Any cost not specifically described under section 4.02 A above, or otherwise approved in advance and in writing by Barton Malow Company and Owner.

4.03 QUOTATION FORMAT

Based on the above, the following formula will be utilized by all of the Contractors.

Number of PCO - Quotation Only, F.O _____
 Date of PCO - Quotation Only, F. O. _____
 Description of Change _____

Cost of Changed Work

Labor:

Carpenter	(No. of Hrs. x Rate)	xxx.xx	
Labor	(No. of Hrs. x Rate)	xxx.xx	
Ironworker	(No. of Hrs. x Rate)	<u>xxx.xx</u>	
		xxx.xx	xxx.xx
Mark-up on labor @	_____ %	xxx.xx	

Equipment, Materials, Supplies:

Ace Hardware	xxx.xx	
Acme Products	xxx.xx	
Concrete Supplier	<u>xxx.xx</u>	
	xxx.xx	

Subtotal	xxx.xx	
OH&P @ [15] %	<u>xxx.xx</u>	
Subtotal (1)		xxx.xx

Subcontractor Costs

ABC Welding	xxx.xx	
XYZ Resteel	<u>xxx.xx</u>	
	xxx.xx	
Overhead Cost @ [5] %	<u>xxx.xx</u>	

Subtotal (2)		xxx.xx
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TOTAL QUOTATION AMOUNT

Work by Own Forces	xxx.xx (1)	
Work by Subcontractors	<u>xxx.xx</u> (2)	
Total Quotation	<u>xxx.xx</u>	

Contractor/Subcontractors are to provide backup and breakdown documentation of all work items and costs to the satisfaction of Barton Malow Company so that it may accurately approve and recommend payment of same to Owner.

END OF SECTION 01250

**SECTION 01290
PAYMENT PROCEDURES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
1. Schedule of Values
 2. Application for Payment Process
 3. Reduction of Retention
 4. Payment for Materials Stored Off-site
 5. Waivers of Lien and Sworn Statements

PART 2 - PAYMENT PROCEDURES**2.01 SCHEDULE OF VALUES**

- A. Once the Agreement is awarded, each Contractor must submit a Schedule of Values for its entire Work to Barton Malow Company for approval. This Schedule of Values must be submitted either within fifteen (15) days of award or fifteen (15) days prior to the first payment application deadline (per the Application for Payment Schedule), whichever comes first. The Schedule of Values must include labor and material line items for each portion of the Work (larger portions of Work such as concrete, curtainwall, drywall, mechanical, and electrical shall be broken down by elevation, floor, and areas appropriate), the Contractor shall separate bond costs, and general conditions line items as appropriate.
- B. The Schedule of Values will be submitted in a format as prescribed by, and to the level of detail specified by, Barton Malow Company.
1. The sum of the parts of the Schedule of Values shall equal the contract price.
 2. The minimum level of breakdown and order on the application for payment will be:
 - a. Bond costs, if applicable
 - b. General conditions line item(s)
 - c. Division 1 cost breakdown as required
 - d. Costs associated with preparation of closeout paperwork and documentation
 - a. The following line items shall be included:
 - i. Closeout – equal to 2% of contract value, not to exceed \$25,000
 - ii. Cleanup – equal to 2% of contract value, not to exceed \$2,000
 - e. Major portions of the Work shall be broken down into **labor** and **material** line items for specific areas of the facility
 3. Schedule of Values items shall have a direct and understandable relation to the Project master construction schedule.
 4. Overhead and profit shall be listed as a separate line item on the schedule of values.
- C. The Schedule of Values, unless objected to by Barton Malow Company, Owner or Architect, shall be the basis for the Contractor's application for payments.

- D. Barton Malow Company shall have the right to require the Contractor to alter the value or add/delete categories listed on the Schedule of Values at any time for the following reasons:
1. The Schedule of Values appears to be incorrect or unbalanced.
 2. A revision of the Schedule of Values is required due to the Contractor revising the sequence of construction or assembly of building components that in turn invalidates the Schedule of Values.
 3. Change Orders are issued to the Contractor and shall be incorporated into the Schedule of Values as a separate line item at the bottom of the Schedule of Values.
- E. The Contractor is required to correlate the documentation for payment of stored materials requested in the application for payment against the agreed upon breakdown of the Schedule of Values as described in Part 3 Payment for Stored Materials. Barton Malow Company reserves the right to not process the application for payment if this correlation has not been submitted in conjunction with the application.

2.02 APPLICATION FOR PAYMENT PROCESS

20TH OF MONTH - ROUGH DRAFTS DUE
25TH OF MONTH - FINAL APPLICATION CUT-OFF DATE

A. Step 1 JOB-SITE INSPECTION - DRAFT PAYMENT REQUEST

On or before the twentieth (20th) of the month, according to Barton Malow Company's Application for Payment Schedule, the Contractor shall have a representative visit the Project site. The Contractor's representative will walk the Project site with Barton Malow Company's representative. The Contractor is to invoice for Work from the twentieth (20th) of last month to the twentieth (20th) of the present month. The Contractor shall submit during the review, the itemized rough draft of the Application and Certificate for Payment (AIA Documents G702 and G703 Continuation Sheet) identifying the Work completed, if any, during the current calendar month; shall review same with Barton Malow Company and obtain a preliminary approved copy of the draft for official submission (See Step 2). Contractor's pay application shall only reflect Work completed through the date of submission. In no event will payments be authorized for forecasted Work. If the walk through occurs before the last day of the payment cycle, Barton Malow Company shall determine, in its sole discretion, the amount Contractor may invoice, if any, for Work scheduled to be in place by the last day of the payment cycle.

NOTE: No payment shall be issued to a Contractor for materials stored off-site unless supported by proper documentation as required by Barton Malow Company (upon advance notification of such requests only) as described in Part 3 Payment for Stored Materials.

Step 2 PAYMENT REQUEST PREPARATION/SUBMISSION

With the information agreed upon in Step 1, the Contractor will prepare a formal application for payment request. Four (4) originals of the request and four (4) originals of the sworn statements (see Part 4) must be submitted to Barton Malow Company's Site office on or before the twenty-fifth (25th) of the month, or as scheduled (see Section 01600 Application for Payment Schedule). Late or incomplete application packets will not be accepted. The payment request will be made on an Application and Certificate For Payment form (AIA documents G702 and G703). Copies of these forms are included in Section 01600 Forms. Before submitting these documents to Barton Malow Company, each request for payment must be signed by a duly authorized agent of the Contractor and notarized. The Contractor must include with each request for progress payment a waiver of lien for all previous payments, Contractor's sworn statement and any necessary backup data as described in Part 4, Waivers of Lien and Sworn Statements.

In addition, at submission of the final pay application Contractor shall provide unconditional final waivers of lien for all Subordinate Parties, as well as all documentation required under Section 01700 of the Project Manual – Contract Closeout and all additional back up data described in Part 4, Waivers of Lien and Sworn Statements. In requests for payment which follow the execution of a Change Order in excess of twenty-five percent (25%) of the Agreement price, Contractor must present a bond rider evidencing that the penal sum of any required payment and performance bonds have been increased to one hundred percent (100%) of the adjusted Agreement price, or such other percentage as set forth in Section 00200 of the Project Manual, Instructions to Bidders. Submission of the required back-up data is a condition precedent to payment.

Step 3 CHECK DISTRIBUTION

- A. Barton Malow will issue individual checks to each Contractor. The Contractor will receive the waiver of lien and will be required to sign the waiver before receipt of the check each month (see Part 4).
- B. The Contractor shall provide all supporting documentation substantiating the Contractor's right to payment as the Owner, Barton Malow Company and the Architect may require.

2.03 REDUCTION OF RETENTION

- A. Barton Malow Company shall be entitled to withhold ten (10%) percent of each payment due to a Contractor until Substantial Completion of the Contractor's Work. When fifty (50%) percent of the value of the Work has been satisfactorily completed, the Contractor may submit a **written request** to Barton Malow Company that no additional retainage be held throughout the balance of the Agreement. Barton Malow Company may grant or deny the request in its sole discretion, based upon its opinion of the progress and performance of the Contractor through the date of the request. If the request is granted and the Contractor's Work subsequently fails to meet contracted requirements, does not conform to Contract, or the Contractor does not meet its schedule commitments, the ten (10%) percent retainage shall be reinstated.
- B. The Contractor, when requesting a reduction of retention, shall submit to Barton Malow Company, an AIA G707, Consent of Surety to Reduction In or Partial Release of Retention form in Section 01600 Forms.
- C. Within thirty (30) days after Certificate of Substantial Completion has been issued for all portions of its Work, the Contractor's retention may be reduced to a sum as Barton Malow Company may determine is suitable to protect Barton Malow Company and the Owner for all incomplete Work and any unsettled claims.
- D. Notwithstanding the foregoing, payment of retention shall be subject to all other conditions precedent that apply to payment as set forth in the Contract Documents.

PART 3 - PAYMENT FOR MATERIALS STORED OFF-SITE

3.01 PAYMENT FOR MATERIALS STORED OFF-SITE

- A. The Contractor, if intending to use an off-site storage area or facility for stored materials, shall submit a written request to the Barton Malow Company and obtain approval prior to submitting the first application for payment as described in Part 2 Applications for Payment.
- B. Payments will be made for materials properly stored off site. Properly stored shall mean in an insured warehouse with the Owner and Barton Malow Company being named as insureds, and all material identified as property of the Owner. The Contractor is responsible for all associated off site storage costs, transportation, insurance, including insurance coverage for stored material, while in transit, unless Contractor obtains written documentation that the material is covered during transit under a Builder's Risk Policy applicable to the Project. Contractor shall provide Barton Malow Company and the Owner verification in writing for all material so stored.

Such materials shall be protected from diversion, destruction, theft, and damage to the satisfaction of Barton Malow Company, Owner and the Lender (if any), specifically marked for use on the Project, and segregated from other materials at the storage facility. The Contractor bears all risk of loss to materials and equipment stored off site.

- C. Contractors are to provide supporting documentation in the form of invoices, insurance policies, and any other pertinent documentation as requested by Barton Malow Company or Owner for items the items stored off-site. Documentation shall include the following:
- 1) Detailed description of the material including quantities that will serve as a material description for the billing and as information to file a claim with an insurance company.
 - a) Stored Materials - Each item must be identified as to manufacturer, model number, and serial number, if applicable, or other identifiers should be listed for each item. Each listing must be accompanied by invoices, shipping tickets, consent of surety, and any other applicable supporting documentation.
 - b) Stored Manufactured Building Materials - Each item must be identified as to type, manufacturer's number or designation, and should also list the number of cartons and the contents therein storage. Each listing must also be accompanied by supporting documents including all invoices, shipping tickets and consent of surety.
 - c) Stored Fabricated Materials - A listing specifying the number of pieces, items, and marks as may be applicable to the particular type of items. Photographs should accompany the request.
 - 2) Individual itemized costs of materials and the total cost value, which shall not exceed the Contractor's subcontractor or material supplier cost. The total cost value shall be supported by the Contractor's subcontractor or material supplier invoices for the stored material.
 - 3) Estimated cost value for those materials that are fabricated by the Contractor's subcontractor or material supplier.
 - 4) The location where the material is physically stored, including the warehouse address and storage location within the warehouse, such as bin number, aisle number or other designation. All material shall be segregated and marked.
 - 5) Copies of the insurance policies that cover the stored materials and that names Barton Malow Company and the Owner as insureds. The limit of the insurance policy shall be equal to or greater than the replacement value of the stored materials.
- D. When Applications for Payment include products stored off the Project Site or stored on the Project Site but not incorporated in the Project, for which no previous payment has been requested, a complete description of such product shall be attached to the application.
- E. Contractor shall submit a certificate of title listing the Owner's and Barton Malow Company's ownership in the off-site stored materials equal to the amount paid effective at the time funds are delivered.
- F. If the size, quantity, and/or type of material or product are such that a bonded warehouse is deemed unsuitable, then, with Barton Malow Company's approval, the Contractor may elect to pre-pay its subcontractor or supplier for certain material and products which are to remain on and be stored on that subcontractor/supplier's premises until needed by the Project. In such event, the Contractor shall enter into a security agreement with the subcontractor/supplier under which the Contractor shall be granted a security interest in and to all such material and products fabricated and/or to be supplied by the subcontractor/supplier for this Project and stored on the subcontractor/supplier's premises.

This Security Agreement shall be a part of the financing statement, which shall be presented to a filing officer for filing pursuant to the Uniform Commercial Code. All expenses incurred in obtaining this security agreement shall be at Contractor's sole cost and expenses, and shall not accrue to the Owner, Barton Malow Company, Architect, nor the Project. A copy of each and every security agreement shall be filed with Barton Malow Company with the first Application for Payment which requests payment for such material or products.

- G. All payment requests for off-site stored materials must be accompanied using the "Payment Request for Stored Materials" and a "Subcontractor Affidavit for Stored Materials" form in Section 01600 Forms. Payment requests for stored materials not complying with the foregoing requirements will not be approved. Contractors are to notify the Barton Malow Company in ample time to conduct verification procedures.
- H. Contractors may not apply the cost of materials stored off-site towards a reduction in the retention amount.
- I. Representatives of Barton Malow Company, Owner and the Lender (if applicable) shall have the right to make inspections of the storage areas at any time.

PART 4 - WAIVERS OF LIEN AND SWORN STATEMENTS

4.01 WAIVERS OF LIEN

- A. The Contractor's first Application for Payment (see Part 2 Applications for Payment) will be based upon 100 percent of the value of Work installed. The first payment, amounting up to 90 percent of application, will be made to the Contractor without supporting documentation. Subsequent Applications for Payment must be accompanied by lien waivers from the Contractor, its Subordinate Parties or receipted invoices covering payment to the Contractor for previous calendar month period. Lien waivers must be unconditional and must show the amount paid.
- B. An "Acknowledgment of Payment and Partial Unconditional Release" (see Section 01600 Forms) will be printed and distributed with the check to each Contractor by Barton Malow Company for payment of the previous month's application. The Waiver of Lien is to be signed by an authorized representative of the Contractor. Under no circumstances will payment be released until the completed "Acknowledgment of Payment and Partial Unconditional Release" has been submitted and signed by the Contractor from the previous month.
- C. Final payment will not be made until a "Final Release Subcontractor/Material-man" (see Section 01600 Forms) has been submitted. This will also be distributed by the Barton Malow Company for Contractor signature and must be returned by the Contractor. The Final Release must be signed by an authorized representative of the Contractor must be notarized.
- D. Final unconditional waivers will be required for all of Contractor's Subordinate Parties listed on Contractor's sworn statement. These final waivers must be submitted along with the final release, before payment can be made.

4.02 SWORN STATEMENTS

- A. The appropriate number of original "Sworn Statements" (see Section 01600 Forms) must be completed to the satisfaction of Barton Malow Company, signed and notarized by an authorized representative of the Contractor and submitted with the Contractor's Application for Payment (see Part 2) monthly to the Barton Malow Company.
- B. The Contractor's Subcontractor's sworn statements, waivers and other supporting documentation will be required with each pay application.

END OF SECTION 01290

**SECTION 01310
MEETINGS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF REQUIREMENTS

- A. The Barton Malow Company shall schedule, chair, and administer all periodic meetings throughout the progress of the work for the purpose of coordinating and expediting the Work. Such meetings shall be held at the job site bringing together responsible representatives of active Contractors for the purpose of planning, assessing progress and discussing problems of mutual concern. Each Contractor, and its Subordinate Parties' representative attending the meetings shall be authorized to act on behalf of and make decisions/commitments for the entity each represents, the decisions made at the meetings and each Contractor who should be in attendance will be held responsible for information and directions given at the meeting.
- B. The Barton Malow Company will prepare and distribute the minutes of all meetings, if Barton Malow Company determines minutes are required. If the attendees do not object in writing to any part of the meetings within ten (10) days of distribution of the minutes, the minutes shall be accepted as written.
- B. The scope of meetings include, but are not limited to:
1. Preconstruction Meeting
 2. Job Progress/Coordination Meetings
 3. Other Meetings

PART 2 - TYPES OF MEETINGS**2.01 PRE-CONSTRUCTION MEETING (KICK-OFF)**

- A. A Preconstruction (kick-off) meeting will be conducted with representatives of all the Contractors within thirty (30) days after the Agreement is awarded at the jobsite or as designated by the Barton Malow Company. The agenda may include:
- a. Discussion on major subcontracts and suppliers
 - b. Major and/or critical work sequencing regarding the project schedule
 - c. Project coordination and designation of responsible personnel
 - d. Procedures and processing of field instructions, requests for proposal, submittals, change orders, applications for payment, etc.
 - e. Quality assurance/control issues
 - f. Adequacy of distribution of contract documents
 - g. Procedures for maintaining record documents
 - h. Use of premises, office, work and storage areas and other Barton Malow Company requirements
 - i. Construction facilities/temporary utilities
 - j. Safety and security procedures
 - k. Other administrative procedures
 - l. Review of Owner expectations

2.02 JOB PROGRESS/COORDINATION MEETINGS

A. On-site project coordination/progress meetings will be held on a bi-weekly basis or as appropriate throughout the life of the Project. The Barton Malow Company will set the agenda for the Project progress meeting. At a minimum, each Contractor shall be prepared to discuss the following:

- a. Actual vs. scheduled progress for the prior two-week period
- b. Planned construction activities for the next four weeks
- c. Problems with, revisions to and corrective measures and procedures to regain the construction schedule, if required
- d. Review of off-site fabrication, delivery schedules
- e. Document clarification requests
- f. Coordination items with other Contractors
- g. Changes in the work affecting cost and/or time
- h. Submittals and shop drawings
- i. Field observations, problems, and conflicts
- j. Quality control issues and non-conformance resolutions
- k. Safety issue

2.03 OTHER MEETINGS

A. **QUALITY ASSURANCE MEETINGS** - Barton Malow Company may conduct quality assurance/quality control meetings as necessary during the progress of the Work. Barton Malow Company will set the agenda for the quality meeting. At a minimum, the Contractor shall be prepared to discuss the following:

- a. Testing and inspection procedures
- b. Tolerance requirements
- c. Quality samples
- d. Reporting of non-conformance items
- e. Corrective actions assigned
- f. Disposal of non-conforming items
- g. Job procedures

B. **SAFETY MEETINGS** - Refer to Section 00810 Safety and Loss Control Program for more information.

C. **INSPECTIONS TOURS** - Formal inspections/tours may be made of the Project progress by the Owner, Architect, local, state or federal officials, insurance representatives, or others as the occasion warrants and as scheduled by Barton Malow Company. If requested by Barton Malow Company, each Contractor shall be prepared to show and explain Work throughout the building to the inspecting parties, in addition to providing Work in compliance with these inspections.

D. **CHANGE REQUEST MEETINGS** - Upon issuance of a major Proposal Request (a.k.a. bulletin), Barton Malow Company may conduct a meeting as necessary with all significant Contractors to review its contents and determine cost, delivery and schedule impacts. At a minimum, the Contractor shall be prepared to discuss the following:

- a. Impact of out-of-sequence work
- b. Identification of pertinent long-lead material and system impact
- c. Alternative recommendations
- d. Evaluation of approximate cost magnitude
- e. Evaluation of impact on completion
- f. Alternate sequencing
- g. Due date for Contractor pricing and scheduling impact

END OF SECTION 01310

**SECTION 01320
COMMUNICATIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
 1. Contractor Correspondence
 2. Contractor's Daily Report
 3. Request for Information (RFI)

1.03 SUBMITTALS

- A. Submittals shall be submitted based on each technical specifications section. Submittals containing information about more than one specification section will be returned for re-submittal. When the specifications call out specific materials, products or devices with model numbers, which the Contractor intends to use for the work, the Contractor can submit the Material Compliance Submittal form (found at the end of Section 01330). This form is to be signed by an officer of the company and notarized by a Certified Notary Public in the State of Michigan within fifteen (15) days of award of the contract. List all specified materials, products, etc. (with specific model numbers, series, type, etc.) certifying that the Contractor commits to using these products or materials as specified for their scope of work. **No Substitutions!** This certification letter will negate the need to provide individual submittals for these materials, products, devices. Contractor will provide information to allow proper coordination including electrical, mechanical connections and size, weight data.

PART 2 - METHODS OF COMMUNICATION

2.01 CONTRACTOR CORRESPONDENCE

- A. All field and/or construction correspondence and/or communications must be directed through Barton Malow Company **1301 Boyd, Troy, MI 48083** and should list the following as appropriate:

**Project: Troy School District, 2004 Bond Program
Athens High School Concessions' Remodeling
Bid Package # 9393**

Additional Project Designations required on some forms:
Barton Malow Company Project Number: **041049**
Architect's Project Number: **#2643-20**
Bid Package and Category Number **Bid Pack #9393**

Subject: Clearly indicate subject matter of correspondence

2.02 CONTRACTOR'S DAILY REPORT

- A. Each **Contractor** will prepare and distribute daily to Barton Malow Company a comprehensive daily report and maintain it during the entire project period. The daily report shall be submitted to Barton Malow Company's superintendent by the end of the day for that day's Work.

- A. Each **Contractor** is responsible for specifically alerting Barton Malow Company to items which could result in claims or delays. **The daily report shall include the following as a minimum:**
- * **Manpower by trade**
 - * **Weather**
 - * **List of visitors**
 - * **Detailed description of work being performed with specific location, floor, and all other pertinent information**
 - * **Situations or circumstances which could delay work or give causes for delays or claims for extension or added costs**
 - * **Instruction of information requested**
 - * **Accidents, injuries, and incidents**
 - * **Materials received with attached material receipts**
 - * **Major equipment arrivals/departures**
- B. Each **Contractor** may provide its own daily report if it covers the same issues as addressed in Barton Malow Company's Contractor Daily Report form. The suggested Contractor Daily Report form will be provided to the **Contractor** and is in Section 01600 - Forms.

2.03 REQUEST FOR INFORMATION (RFI)

- A. The Request for Information (RFI) is in Section 01600 Forms.
- B. In the event that a clarification is required due to a question raised by the **Contractor** pertaining to the Contract Documents, the **Contractor** shall submit a Request for Information (RFI) to the Barton Malow Company, which will be forwarded to the Architect.
- C. The Architect will return the RFI to Barton Malow Company as expeditiously as possible with its reply. In some instances, the Architect may issue its reply to the RFI on other documents, in which case, the RFI will simply reference these documents.
- D. The RFI will be returned to the **Contractor** by Barton Malow Company. The **Contractor** is responsible to give proper notice as set forth in the Contract Documents if a response will cause the **Contractor** to incur additional expense or expend additional time which could impact the schedule. If extra work or an additional cost may exist due to the clarification, Barton Malow Company may issue a PCO- Quotation Only or PCO- Notice to Proceed to the **Contractor** as described in Section 01250 Changes in the Work of the Project Manual.

END OF SECTION 01320

**SECTION 01330
SUBMITTALS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Specific attention is directed to all Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section and relate to various submittals required to be submitted to Barton Malow Company for the Project.
- B. Submit to Barton Malow Company: Shop Drawings, Certifications, Product Data, Samples, Tests, and all other submissions required by the Architect's technical specifications. Refer to each specification section for specific submittal requirements.

1.02 SUMMARY

- A. This Section describes the following requirements including:
 - 1. Scope
 - 2. Submittal Register
 - 3. Submittal Requirements
 - 4. Submittal Process and Responsibilities
 - 5. Re-submission Requirements

1.03 SCOPE

- A. Where requirements of this Section vary from the requirements of the General Conditions, this Section's requirements shall take precedence.
- B. Barton Malow Company will prepare and submit a submittal register/schedule for Contractor's use in preparing submittals required for the Project. Contractors shall complete the submittal schedule/register showing the dates for submission, lead times required and their expected delivery dates. Submittals received on the date scheduled will be processed as specified. Contractor is responsible to provide all submittals required under the Contract Documents, whether or not listed in the submittal register. Barton Malow Company/Owner/Architect **will not** be held responsible for delays due to receiving submittals after the date indicated in the Contractor's submittal schedule.
- C. The Architect will review the submittals within (10) working days after receipt in the Architect's office. Submittals that must be reviewed by the Architect's consultants will be reviewed within fifteen (15) working days. The Architect or his consultant will be checking only for conformance with the design compliance of the Project and compliance with information given in the Contract Documents. Submissions that are large or of multiple submissions or requires detailed or lengthy review by the Architect or his consultant may require additional time. Submissions for products or material that require a long lead time for delivery shall be noted as such and marked "Top Priority" so the architect may expedite the process.
- D. Submittals shall be submitted based on each technical specification section. Submittals containing information about more than one specification section will be returned for re-submittal. When the specifications call out specific materials, products or devices with model numbers, which the Contractor intends to use for the work, the Contractor can submit the Material Compliance Submittal form (found at the end of Section 01330). This form is to be signed by an officer of the company and notarized by a Certified Notary Public in the State of Michigan within **fifteen (15)** days of award of the contract. List all specified materials, products, etc. (with specific model numbers, series, type, etc.) **CERTIFYING THAT THE Contractor commits to using these products or materials as specified for their scope of work.**
No Substitutions! This certification letter will negate the need to provide individual submittals for these

materials, products or devices. Contractor will provide information to allow proper coordination including electrical, mechanical connections and size, weight data.

- D. **Compliance Certificate:** Refer to the attached Compliance Certificates (immediately following this section) for submissions document to be used by the contractor to indicate the product/devices intended for use in this project without the need for a formal shop drawings submittal. Items listed on this certificate are to be approved products indicated in the specifications. With the submission and approval of this document **NO FURTHER SUBMITTALS ARE REQUIRED** for the indicated specification section on the certificate.

The following specification sections are subject to this certificate:

- E. No shop drawings, product data, or samples will be accepted by Barton Malow Company until Subordinate Parties have been approved.
- F. **Coordination:** Each Contractor shall coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. The Contractor, by providing the submittal assures the Owner, Architect and Barton Malow Company that the product or system submitted is available and deliverable in accordance with the schedule requirements.
 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
 3. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 4. Barton Malow Company reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 5. Coordinate each submittal as required with all trades and with all public agencies involved.
 6. Secure all necessary approvals from public agencies and others; signify by stamp or other means that all required approvals have been obtained.
- G. Category Format Process: Submittals for this Project will be classified and managed using the following categories.

Category 1 - A submittal that establishes a level of quality by complying with the manufacturer and manufacturer's designated identifier as called for in the Contract Documents. Provide a "Letter of Compliance" committing to the use of specified components.

For record purposes, as part of the Letter of Compliance (or subsequently providing) a listing of those components will actually used or to be used. The Architect will only respond to the Letter of Compliance if something is wrong. This letter of compliance is contractually binding.

Category 2 - A submittal that represents a number of components assembled to represent a specific project need, or standard components that require modification to also meet a specific Project need. Individual submittals that completely represent their intent of the Contract Documents are required for this category. This type of submittal will be processed in a manner through the typical circle. A Contractor to Barton Malow Company or Architect to Barton Malow to Contractor.

Category 3 - A submittal that confirms compliance with governmental, industry or otherwise specified standard and/or requirements. Required is a Letter of Compliance committing the Contractor to obtain for record and/or otherwise be responsible for meeting the requirements of the contract documents. The Architect will only respond to the Letter of Compliance if something is wrong. This letter of compliance is contractually binding.

After the Award of Agreement, Barton Malow Company will provide the Contractor with a listing of submittal items.

Designation of Category 1 or 3 does not relieve the Contractor from providing the appropriate detailed documentation to Barton Malow Company and to other trades for the purpose of coordination of Work.

PART 2 - SUBMITTAL REGISTER

2.01 SUBMITTAL REGISTER/SCHEDULE

- A. Barton Malow Company shall prepare and submit a listing of all items requiring submission, organized by specification section number, including the required close-out document submission recipients.
- B. Submittal listings may include such items as:
 1. Contractor's, or Subordinate Parties shop drawings.
 2. Descriptive submittal types including, but not limited to:
 - a. catalog cuts/product data
 - b. diagrams
 - c. operation charts or curves
 - d. test reports
 - e. samples
 - f. operations and maintenance manuals, including parts list
 - g. certifications
 - h. warranties/guarantees
 - i. other close-out documentation required
 3. The Contractor's submittal register returned to Barton Malow Company shall include as a minimum:
 - a. Submittal type and breakdown by specification section number of how the Contractor intends to submit the individual submittals for review (according to an intended sequence, area, etc.)
 - b. Scheduled date for initial submittal of item
 - c. Days required after return of approved submittal(s) to fabricate and deliver the specific item to the site (if applicable).
 4. Barton Malow Company shall have the right to require the Contractor to add and/or delete items on the submittal register at any time.
 5. Adequate time (approximately 3 weeks) shall be allowed for review and approval and possible re-submittal of any item subject to approval. No delay damages or time extensions will be allowed for time lost in late submittals or re-submittals.
 6. The submittal register shall be coordinated with the schedule of values to insure delivery and payment requests are projected accurately. The Barton Malow Company will not be responsible for failure of the Contractor to properly schedule the process of material/product design, submittal, review, fabrication, delivery, storage and installation.

- C. **The submittal register will become a part of the Agreement and the Contractor will be subject to requirements thereof.**
- D. Each Contractor shall carefully coordinate preparation and processing of submittals to the performance of the Work so the Work will not be delayed by submittals. Coordinate and sequence different categories of submittals for the same Work and for interfacing units of Work, so that one will not be delayed by the coordination of the Architect's review with another. Drawings of component items forming a system or that are interrelated shall be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled.
- E. Furnish approved copies of shop drawings, diagrams, templates, catalog cuts, technical data, etc. to other Contractors in other related Work designated by Barton Malow Company for the purposes of coordination of this Work.
- F. If a Contractor does not submit the required submittal by the date marked on the submittal register, the Contractor will be subject to a \$20/hr engineering fee back charge. This fee is established ONLY to ensure timely submission of submittals.

PART 3 - SUBMITTAL REQUIREMENTS

3.01 GENERAL

- A. Each submittal shall show Contractor's review stamp, with handwritten signature, certifying review of the submittal, verification of field measurements and compliance with the Contract Documents.
- B. Each submittal shall be accompanied with a Barton Malow Company Submittal Transmittal Form. A Submittal Transmittal Form will be provided to the Contractor See Section 001600 Forms. The following information shall be furnished by the Contractor on the submittal transmittal form:
 - 1. Date
 - 2. Project name and Architect's and the Barton Malow Company's project number
 - 3. Names and Address of:
 - a. Architect
 - b. The Barton Malow Company
 - c. Contractor
 - d. Subcontractor (if applicable)
 - e. Supplier
 - f. Manufacturer
 - 4. Identification of product or material
 - 5. Technical Section number, clearly identified. On multiple submittals, a separate transmittal should be completed for each specification section on items being submitted.
 - 6. Reference to construction drawings by drawing number
 - 7. The quantity of each Shop Drawing, Product Data or Sample submitted
 - 8. Notification of deviations from Contract Documents
 - 9. Other pertinent data
 - 10. LEED Requirements, including Post Consumer Recycling Content, Post-Industrial Recycled Content, Material Cost, and Distance from manufacturing point to jobsite, of Rapidly Renewable Content.

Submittals not so transmitted will be returned un-reviewed. Re-submissions shall be so noted on the transmittal.

- C. Unless noted otherwise on the submittal, all submissions will be considered to be "as specified."

3.02 REQUIRED QUANTITIES OF SUBMITTALS

A. The following number of originals and copies will be required for each type of submittal:

<u>Submittal Type</u>	<u>Submit</u>
1. Manufacturer's, supplier's or Contractor's shop drawings	<u>5</u> Sets
2. Manufacturer's catalog sheets, product data, brochures, diagrams, schedules, performance charts, etc.	<u>5</u> Copies
3. Samples	<u>4</u> Samples (unless a specific number is required by specification)
4. Certifications	<u>2</u> Copies
5. Warrantees/Guarantees	<u>2</u> Copies
6. Test Reports	<u>2</u> Copies
7. Operating and Maintenance Manuals/Data	<u>2</u> Copies

B. Following review by the Architect, documents will be distributed as follows:

1. One copy to be retained by the Architect
2. One copy to be sent to Owner/Architect
3. One copy each of original and reviewed submittal to be retained by Barton Malow Company
4. Sepias and all remaining copies to be returned to Contractor

3.03 SUBMITTAL IDENTIFICATION

- A. This paragraph is included to explain the method for submittals identification using Section 08710. Finish Hardware and the Finish Hardware Schedule as an example.
- B. The Contractor shall assign submittal designations utilizing the following format and system.
- C. The number for the first shop drawing submitted under that Section would be 08710-1A, the "1" designating that this is the first submittal under Section 08710; and the "A" "signifying" that it is the first time a "finish hardware" schedule has been submitted to the Architect's office. If this "finish hardware" submittal is marked "rejected-resubmit", the re-submittal would retain the 08710-1 but "A" would be changed to 08710-1"B" to designate re-submittal; the next re-submittal 08710-1"C", etc. until this "finish hardware" item is approved.
- D. The second "finish hardware" submittal (door alarms) sent to the Architect's office for the first time would be 08710-2A, etc.

PART 4 - TYPES OF SUBMITTALS

4.01 SHOP DRAWINGS

- A. Submit Shop Drawings as single copies in the form of positive printing reproducible transparencies (commonly called sepia prints) suitable for reproduction use on dry print diazo type machines and the required number of blue lines. Sepia prints which cannot be reproduced will be returned to the Contractor for re-submittal.

- B. Provide Shop Drawings as complete submittals (no partial sets) on original drawings or information prepared solely by the fabricator or supplier. In no instance shall the Contract Drawings be reproduced for Shop Drawing submittals.
- C. Sheet sizes shall not exceed the size of the Contract Drawings or smaller than 8-1/2" X 11".
- D. Each sepia print shall have blank spaces large enough to accept two (2) 3" x 6" review stamps of the Contractor, the Barton Malow Company, and the Architect.
- E. Each sepia print shall carry the following information:
 - 1. Project name, Architect's and Barton Malow Company's project number.
 - 2. Date and Revision Dates.
 - 3. Names of and Address' of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - 4. Identification of product or material.
 - 5. Relation to adjacent structure or materials.
 - 6. Field dimensions, clearly stated as such.
 - 7. Technical Section number.
 - 8. Applicable standards such as ASTM or Federal Specification.
 - 9. Identification of deviations from Contract Documents.
 - 10. Reference to construction drawings by drawing number and/or detail number.
- F. Submit sepia prints without folds either as flat sheets if size permits, or rolled in tubes.

4.02 PRODUCT DATA

- A. Product Data such as catalog cuts, brochures or manufacturer's preprinted sheets may be submitted in lieu of sepia prints if adequately identified. Submit the required number of copies of product data to the Barton Malow Company.
- B. Modify Product Data sheets to delete information that is not applicable to the Project. Provide additional information if necessary to supplement standard information.
- C. Product Data Sheets that are submitted with extraneous information not deleted and/or modified will be returned without review to the Contractor for re-submittal.

4.03 SAMPLES

- A. Provide physical Samples to illustrate materials, equipment or workmanship, and to establish standards by which completed work may be judged as required by the technical section.
- B. Provide Office Samples in sufficient size and quantity to clearly illustrate full range of colors, textures, etc. available and the functional characteristics of the product or material.
- C. Erect Field Samples or mock-ups as required by the technical sections and/or Barton Malow Company at the Project site in a designated location by Barton Malow Company. Construct field samples complete, including Work of all trades required in finishing the Work. Provide Field Samples at the request of the Architect and/or Barton Malow Company where construction materials and/or methods deviate from the requirements of the intent of the Contract Documents or conventional construction practice.

4.04 CERTIFICATIONS

- A. Provide certifications as required by various technical sections on the Contractor's letterhead stationary. (See item D of Section 1.03 SCOPE.)
- B. Certifications shall clearly identify the materials in reference and shall state that the material and the intended installation methods, where applicable, are in compliance with the Contract Documents for this project. Attach manufacturer's affidavits where applicable.

4.05 WARRANTIES/GUARANTEES

- A. Provide warranties and/or guarantees as required by the various technical sections and other Contract Documents on the Contractor's letterhead in accordance with the requirements in Section 01740.

4.06 OPERATING AND MAINTENANCE MANUALS

- A. Provide operating and maintenance manuals/data as required by the various technical sections in accordance with the requirements in Section 01730.

PART 5 - SUBMITTAL PROCESS AND RESPONSIBILITIES

5.01 CONTRACTOR'S RESPONSIBILITIES

- A. Before making submittals to Barton Malow Company, review each submittal, make changes or notations as necessary to conform to the Contract Documents, identify such review with review stamp and forward reviewed submittal with comments to Barton Malow Company for review. Return submittals not meeting contract requirements to Subordinate Parties and do not forward such submittals to Barton Malow Company.
- B. Verify field measurements and product catalog numbers or similar data.
- C. Notify the Barton Malow Company and Architect, in writing at time of submission, of deviations in submittals from the requirements of the Contract Documents.
- D. After the Barton Malow Company's and Architect's review, within one (1) week of receipt distribute copies to other Contractors and supplier/fabricators with one copy to be maintained at the Project Site for reference use.
- E. Do not begin Work which requires submittals until return of submittals with Barton Malow Company's and Architect's stamp and initials indicating review.
- F. Contractor's responsibility for errors and omissions in submittals is not relieved by Barton Malow Company's or Architect's review of submittals.
- G. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Barton Malow Company's or Architect's review of submittals unless Barton Malow Company and Architect give written acceptance of specific deviations.

5.02 BARTON MALOW COMPANY'S RESPONSIBILITIES

- A. Barton Malow Company will administratively review all submittals and coordinate them with information contained in related documents. Barton Malow Company's review is for general administrative purposes only and neither this review, nor any subsequent approval by Barton Malow Company of a submittal, shall relieve Contractor from its obligations to comply fully with the Contract Documents.

- B. Barton Malow Company will return to the Contractor, without review, all submittals not bearing the Contractor's review stamp or not showing it has been reviewed by the Contractor.
- C. Barton Malow Company will make changes or notations directly on the submittals, identify such review with its review stamp, sign and forward acceptable submittals to the Architect.
- D. After the Architect's review, Barton Malow Company will forward submittals to the Contractor and retain one copy. Contractor shall distribute copies with one copy to be maintained at the Project Site for reference use and other copies distributed to suppliers/fabricators. Contractor shall supply copies of reviewed submittals to Barton Malow Company in sufficient quantity to allow proper coordination of the Work.

5.03 ARCHITECT'S RESPONSIBILITIES

- A. Architect will review submittals within ten (10) working days after receipt in the Architect's office. Submittals that must be reviewed by the Architect's consultants will be reviewed within fifteen (15) working days. The Architect or his consultant will be checking only for conformance with the design compliance of the Project and compliance with information given in the Contract Documents. Submissions that are large or of multiple submissions or required detailed or lengthy review by the Architect or his consultant may require additional time. Submissions for products or material that require a long lead time for delivery shall be noted as such and marked "Top Priority" so the architect may expedite the process.
- B. Architect will return to Barton Malow Company without review any submittals not bearing the Contractor's or Barton Malow Company's review stamp or not showing that it has been reviewed by the Contractor and Barton Malow Company.
- C. Architect will make changes or notations directly on the submittal, identify such review with its review stamp, obtain and record Architect file copy and return the submittal to Barton Malow Company.
- D. Submittals shall be identified and submitted by individual technical specification sections only.
- E. Kingscott Associates, Inc. will provide, for a fee, electronic data files compatible with AutoCAD 2000 for contractors' convenience and use in the preparation of shop drawings. Immediately following this section is the Request Form for electronic data. This request shall be directed to Barton Malow. Prior to the release of electronic files, the Architect will require a signed waiver of release and payment of the fee.

Approximate Fee Schedule: Fee varies depending on size, type of work, and discipline. Please contact Penny Mitchell at Kingscott (269-381-9440).

5.04 RE-SUBMISSION REQUIREMENTS

- A. For Shop Drawings:
 - 1. Review initial drawings as required and submit as specified for initial submittal.
 - 2. Indicate on drawings all changes which have been made other than those requested by Barton Malow Company or Architect.
- B. For Product Data and Samples:
 - 1. Resubmit new data and samples as required for initial submission.

END OF SECTION 01330

Number	Revision	Description	Specification Section	Sub Section	Responsible Company ID	Supplier	Type	ID	Due Date	Notes
1	0	PD: Cast-In-Place Concrete - Form Facing Material	3300	1.4-A1			PD		4/16/07	Smooth-Formed Finished Concrete, Rough-Formed Finished Concrete, Chamfer Strips, Rustication Strips, Form-Release Agent, Form Ties,
2	0	PD: Cast-In-Place Concrete - Steel Reinforcement	3300	1.4-A2			PD		4/16/07	Reinforcing Bars, Low-Alloy-Steel Reinforcing Bars, Plain-Steel Wire, Plain-Steel Welded Wire Reinforcement
3	0	PD: Cast-In-Place Concrete - Reinforcement Accessories	3300	1.4-A3			PD		4/16/07	Joint Dowel Bars, Bar Supports
4	0	PD: Cast-In-Place Concrete - Materials	3300	1.4-A4			PD		4/16/07	Cementitious Material, Normal Weight Aggregates, Water
5	0	PD: Cast-In-Place Concrete - Admixtures	3300	1.4-A5			PD		4/16/07	Air-Entraining Admixture, Chemical Admixture, Set-Accelerating Corrosion-Inhibiting Admixture
6	0	PD: Cast-In-Place Concrete - Reinforcement	3300	1.4-A6			PD		4/16/07	Synthetic Fiber
7	0	PD: Cast-In-Place Concrete - Waterstops	3300	1.4-A7			PD		4/16/07	Tactile Warning Strips
8	0	PD: Cast-In-Place Concrete - Vapor Retarders	3300	1.4-A8			PD		4/16/07	Plastic Vapor Retarders, Granular Fill
9	0	PD: Cast-In-Place Concrete - Curing Materials	3300	1.4-A9			PD		4/16/07	Evaporation Retarder, Absorptive Cover, Moisture-Retaining Cover, Clear-Waterborne-Membrane-Forming Curing Compound, Clear-Solvent Borne-Membrane Forming Curing and Sealing Compound, Clear-Waterborne-Membrane Forming Curing and Sealing Compound
10	0	PD: Cast-In-Place Concrete - Related Materials	3300	1.4-A10			PD		4/16/07	Expansion and Isolation Joint Filler Strips, Semirigid Joint Filler, Bonding Agent, Epoxy Bonding Adhesive
11	0	PD: Cast-In-Place Concrete - Repair Materials	3300	1.4-A11			PD		4/16/07	Repair Underlayment, Repair Overlayment
12	0	Design Mixtures: Cast In Place Concrete	3300	1.4-B			MD		4/16/07	For each concrete mixture
13	0	Shop Drawings: Cast In Place Concrete	3300	1.4-C			SD		4/16/07	Steel Reinforcement Shop Drawings
14	0	PD: Unit Masonry Assemblies - Concrete Masonry Units	4810	1.4-A1			PD		4/16/07	Shapes, Concrete Masonry Units
15	0	PD: Unit Masonry Assemblies - Masonry Lintels	4810	1.4-A2			PD		4/16/07	Masonry Lintels
16	0	PD: Unit Masonry Assemblies - Bricks	4810	1.4-A3			PD		4/16/07	Face Brick
17	0	PD: Unit Masonry Assemblies - Mortar and Grout Materials	4810	1.4-A4			PD		4/16/07	Portland Cement, Hydrated Lime, Portland Cement-Lime Mix, Mortar Pigments, Aggregate for Mortar, Aggregate for Grout, Cold Weather Admixture

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18	0	PD: Unit Masonry Assemblies - Reinforcement	4810	1.4-A5			PD	4/16/07	Uncoated Steel Reinforcing Bars, Masonry Joint Reinforcement for Single Wythe Masonry, Masonry Joint Reinforcement for Multitythe Masonry
19	0	PD: Unit Masonry Assemblies - Ties and Anchors	4810	1.4-A6			PD	4/16/07	Wire Ties, Individual Wire Ties, Partition Top Anchors, Rigid Anchors
20	0	PD: Unit Masonry Assemblies - Embedded Flashing Materials	4810	1.4-A7			PD	4/16/07	Metal Flashing, Flexible Flashing, Solder and Sealants for Sheet Metal Flashings, Adhesives, Primers, and Seam Tapes for Flashings
21	0	PD: Unit Masonry Assemblies - Miscellaneous Masonry Accessories	4810	1.4-A8			PD	4/16/07	Compressible Filler, Preformed Control Joint Gaskets, Bond Breaker Strips, Weep/Vent Products, Reinforcing Bar Positioners
22	0	PD: Unit Masonry Assemblies - Cleaner	4810	1.4-A9			PD	4/16/07	Proprietary Acidic Cleaner
23	0	PD: Structural Steel - Structural Steel Material	5120	1.5A1			PD	4/16/07	W-Shapes, Channels, Angles, Plate and Bar, Cold-Formed Hollow Structural Sections, Cold Formed Hollow Structural Sections, Steel Pipe, Welding Electrodes
24	0	PD: Structural Steel - Bolts, Connectors, and Anchors	5120	1.5-A2			PD	4/16/07	High Strength Bolts, Nuts and Washers, Shear Connectors, Headed Anchor Rods, Threaded Rods, Sleeve Nuts
25	0	PD: Structural Steel - Primer	5120	1.5-A3			PD	4/16/07	Primer, Galvanizing Repair Paint
26	0	PD: Structural Steel - Grout	5120	1.5-A4			PD	4/16/07	Cement Grout, Metallic Shrinkage Resistant Grout, Nonmetallic Shrinkage Resistant Grout
27	0	Shop Drawings: Structural Steel	5120	1.5-B			SD	4/16/07	Show Fabrication of Structural Steel Components
28	0	Welding Certificates: Structural Steel	5120	1.5-C			W/C	4/16/07	
29	0	Qualification Data: Structural Steel	5120	1.5-D			Q/D	4/16/07	For Fabricator and Structural Engineer
30	0	Shop Drawings: Metal Fabrications	5500	1.4-A			SD	4/16/07	Show Fabrication and Installation Details for Metal Fabrication
31	0	Qualification Data: Metal Fabrications	5500	1.4-B			Q/D	4/16/07	For Professional Engineer
32	0	PD: Steel Frames - Materials	8110	1.4-A1			PD	4/2/2007	Cold Rolled Steel Sheet, Hot-Rolled Steel Sheet, Frame Anchors, Inserts, Bolts, Fasteners, Grout, Bituminous Coatings
33	0	PD: Steel Frames - Standard Hollow Metal Frames	8110	1.4-A2			PD	4/2/2007	Interior Frames, Hardware Reinforcement
34	0	PD: Steel Frames - Frame Anchors	8110	1.4-A3			PD	4/2/2007	Jamb Anchors, Floor Anchors
35	0	PD: Steel Frames - Accessories	8110	1.4-A4			PD	4/2/2007	Grout Guards
36	0	Shop Drawings: Steel Frames	8110	1.4-B			SD	4/2/2007	

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37	0	Schedule: Steel Frames	8110	1.4-C			SC	4/2/2007	Provide a Schedule of Hollow Metal Work prepared by the supplier
38	0	PD: Overhead Coiling Doors - Door Curtain Materials and Construction	8331	1.5-A1			PD	4/2/2007	Door Curtains, Endlocks for Counter Doors, Bottom Bar for Counter Doors, Curtain Jamb Guides
39	0	PD: Overhead Coiling Doors - Hood	8331	1.5-A2			PD	4/2/2007	General
40	0	PD: Overhead Coiling Doors - Counter Doors	8331	1.5-A3			PD	4/2/2007	Integral Frame, Hood, and Facia for Counter Doors
41	0	PD: Overhead Coiling Doors - Locking Devices	8331	1.5-A4			PD	4/2/2007	Slide Bolt at Counter Doors
42	0	PD: Overhead Coiling Doors - Curtain Accessories	8331	1.5-A5			PD	4/2/2007	Weatherseals, Push / Pull Handles
43	0	PD: Overhead Coiling Doors - Counter Balancing Mechanism	8331	1.5-A6			PD	4/2/2007	Counterbalance Barrel, Spring Balance, Torsion Rod, Brackets
44	0	PD: Overhead Coiling Doors - Manual Door Operators	8331	1.5-A7			PD	4/2/2007	Push up door operation
45	0	Shop Drawings: Overhead Coiling Doors	8331	1.5-B			SD	4/2/2007	For special components and installations not dimensioned or detailed in manufacturers product data
46	0	Product Sample: Overhead Coiling Doors	8331	1.5-C			PS	4/2/2007	Color Sample of Exposed Finish Material
47	0	Shop Drawings: Aluminum Framed Entrances and Storefronts	8411	1.4-A			SD	4/2/2007	Include plans, elevations, sections, details, and attachments to other work
48	0	Warranties: Aluminum Framed Entrances and Storefronts	8411	1.4-B			WA	8/6/2007	Special Warranties Specified in This Section
49	0	PD: Fiberglass Reinforced Polyester Doors - Materials	8412	1.4A1			PD	4/2/2007	Aluminum, Components, Fasteners
50	0	PD: Fiberglass Reinforced Polyester Doors - FRP Doors	8412	1.4A2			PD	4/2/2007	FRP Door Face Sheet, Door Hardware
51	0	PD: Fiberglass Reinforced Polyester Doors - Accessory Materials	8412	1.4-A3			PD	4/2/2007	Fasteners, Bitumous Paint
52	0	Shop Drawings: Fiberglass Reinforced Polyester Doors	8412	1.4-B			SD	4/2/2007	
53	0	Schedule: Fiberglass Reinforced Polyester Doors	8412	1.4-C			SC	4/2/2007	Provide a schedule of work prepared by the supplier
54	0	Product Sample: Fiberglass Reinforced Polyester Doors	8412	1.4-D			PS	4/2/2007	For units with factory applied color finishes
55	0	Hardware Template: Fiberglass Reinforced Polyester Doors	8412	1.4-E			HIT	4/2/2007	Provide finish hardware mounting detail
56	0	Warranties: Fiberglass Reinforced Polyester Doors	8412	1.4-F			WA	8/6/2007	Special warranties specified in this section
57	0	PD: Door Hardware - Hinges	8710	1.3-A1			PD	4/2/2007	Hinges, Fasteners
58	0	PD: Door Hardware - Locks and Latches	8710	1.3-A2			PD	4/2/2007	Latches and locks for means of egress doors, lock trim, lock throw, backset, strikes

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59	0	PD: Door Hardware - Mechanical Locks and Latches	8710	1.3-A3			PD	4/2/2007	Lock functions, Mortise Locks
60	0	PD: Door Hardware - Keying	8710	1.3-A4			PD	4/2/2007	Keying systems
61	0	PD: Door Hardware - Operating Trim	8710	1.3-A5			PD	4/2/2007	Materials, Acceptable Manufacturers
62	0	PD: Door Hardware - Closers	8710	1.3-A6			PD	4/2/2007	Accessibility requirements, door closers for means of egress, size of units, surface closers, Fasteners, metal protective trim units
63	0	PD: Door Hardware - Stops and Holders	8710	1.3-A7			PD	4/2/2007	Stops and Bumpers, mechanical door holders, silencers for metal door frames
64	0	PD: Door Hardware - Thresholds	8710	1.3-A8			PD	4/2/2007	Accessibility requirements, thresholds for means of egress
65	0	Qualification Certification: Door Hardware	8710	1.3-B			QC	4/2/2007	For architectural hardware consultant
66	0	Warranty: Door Hardware	8710	1.3-C			WA	8/6/2007	Special warranty specified in this section
67	0	PD: Interior Painting - Block Fillers	9912	1.3-A1			PD	5/7/2007	Interior/Exterior latex block filler
68	0	PD: Interior Painting - Primers/Sealers	9912	1.3-A2			PD	5/7/2007	Interior latex primer/sealer
69	0	PD: Interior Painting - Metal Primers	9912	1.3-A3			PD	5/7/2007	Alkyd Anticorrosive metal primer
70	0	PD: Interior Painting - Latex Paints	9912	1.3-A4			PD	5/7/2007	Interior latex (Flat), Interior Latex (Semigloss)
71	0	PD: Interior Painting - Alkyd Paints	9912	1.3-A5			PD	5/7/2007	Interior Alkyd (Semigloss)
72	0	PD: Interior Painting - Floor Coatings	9912	1.3-A6			PD	5/7/2007	Interior/Exterior clear concrete floor sealer (solvent based)
73	0	Product Sample: Interior Painting	9912	1.3-B			PS	5/7/2007	For each type of paint system and for each color indicated
74	0	Product List: Interior Painting	9912	1.3-C			PL	5/7/2007	Printout of current "MPI approved list" for each product category specified in part 2, with the proposed product highlighted
75	0	PD: Institutional Casework - Cabinet Fabrication	12355	1.4-A1			PD	4/2/2007	Plastic laminate faced cabinet construction, base moldings, filler strips
76	0	PD: Institutional Casework - Casework Hardware	12355	1.4-A2			PD	4/2/2007	Hardware, butthings, pulls, door catches, drawer slides, drawer and cupboard locks, adjustable shelf supports
77	0	PD: Institutional Casework - Countertops	12355	1.4-A3			PD	4/2/2007	Countertops, Stainless Steel Tops
78	0	Shop Drawings: Institutional Casework	12355	1.4-B			SD	4/2/2007	Show fabrication and installation details for institutional casework
79	0	PD: Basic Mechanical Materials and Methods - Transition Fittings	15050	1.4-A1			PD	5/7/2007	Plastic to metal transition fittings
80	0	PD: Basic Mechanical Materials and Methods - Dielectric Fittings	15050	1.4-A2			PD	5/7/2007	Insulating material, dielectric flange kits, dielectric nipples
81	0	PD: Basic Mechanical Materials and Methods - Mechanical Sleeve Seals	15050	1.4-A3			PD	5/7/2007	

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82	0	PD: Basic Mechanical Materials and Methods - Escutcheons	15050	1.4-A4			PD	5/7/2007	One piece deep pattern type, one piece cast brass type, split casting cast brass type, one piece stamped steel type
83	0	PD: Motors - Variable Frequency Drives (VFDs)	15055	1.4-A			PD	4/2/2007	for each type and size of drive, provide nameplate data and ratings, operating weights, enclosure type and mounting arrangement; size, type and location of winding terminations; conduit entry and ground lug location
84	0	Operations and Maintenance Data - Motors	15055	1.4-B			OM	8/6/2007	
85	0	PD: Hangars and Supports for Plumbing Piping and Equipment - Steel Pipe Hangers and Supports	15061	1.4-A			PD	5/7/2007	Galvanized metallic coatings, nonmetallic coatings, padded hangers
86	0	PD: Mechanical Identification - Piping Identification Devices	15075	1.3-A1			PD	5/7/2007	Manufactured pipe markers, shaped pipe markers, self-Adhesive pipe markers, plastic tape
87	0	PD: Mechanical Identification - Valve Tags	15075	1.3-A2			PD	5/7/2007	Valve Tags
88	0	Valve Schedules: Mechanical Identification	15075	1.3-B			VS	5/7/2007	For each piping system furnish extra copies (in addition to mounted copies) to include in maintenance manuals
89	0	PD: Plumbing Insulation - Insulation Materials	15082	1.3-A1			PD	5/7/2007	Flexible elastomeric, mineral fiber preformed pipe insulation, mineral fiber pipe and tank insulation, polyolefin
90	0	PD: Plumbing Insulation - Insulating Cements	15082	1.3-A2			PD	5/7/2007	Mineral fiber insulating cement
91	0	PD: Plumbing Insulation - Adhesives	15082	1.3-A3			PD	5/7/2007	Flexible elastomeric and polyfin adhesives, mineral fiber adhesives, ASJ adhesive and FSK and PVDC jacket adhesive, PVC jacket adhesive
92	0	PD: Plumbing Insulation - Mastics	15082	1.3-A4			PD	5/7/2007	Vapor barrier mastic (indoor), Vapor barrier mastic (outdoor)
93	0	PD: Plumbing Insulation - Lagging Adhesives	15082	1.3-A5			PD	5/7/2007	lagging adhesives
94	0	PD: Plumbing Insulation - Sealants	15082	1.3-A6			PD	5/7/2007	ASJ flashing sealants and vinyl , PVDC, and PVC jacket flashing sealants
95	0	PD: Plumbing Insulation - Factory Applied Jackets	15082	1.3-A7			PD	5/7/2007	Factory Applied Jackets
96	0	PD: Plumbing Insulation - Field Applied Jackets	15082	1.3-A8			PD	5/7/2007	PVC Jacket
97	0	PD: Plumbing Insulation - Tapes	15082	1.3-A9			PD	5/7/2007	ASJ Tape, PVC tape

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98	0	PD: Valves - Copper Alloy Ball Valves	15110	1.4-A1			PD	5/7/2007	Copper Alloy ball valves, two piece copper alloy ball valves
99	0	PD: Valves - Bronze Check Valves	15110	1.4-A2			PD	5/7/2007	Bronze Check Valves, Type 4 Class 125 Swing Check Valves
100	0	PD: Meters and Gages for Plumbing Piping - Metal Case Liquid In Glass Thermometers	15126	1.4-A1			PD	5/7/2007	Case, Tube, Tube Background, Window, Connector, Stem, Accuracy
101	0	PD: Meters and Gages for Plumbing Piping - Thermowells	15126	1.4-A2			PD	5/7/2007	Thermowells
102	0	PD: Meters and Gages for Plumbing Piping - Pressures Gages	15126	1.4-A3			PD	5/7/2007	Direct mounting dial type pressure gage, pressure gage fittings
103	0	PD: Meters and Gages for Plumbing Piping - Test Plugs	15126	1.4-A4			PD	5/7/2007	Test Plugs
104	0	Product Certificates: Meters and Gages for Plumbing Piping	15126	1.4-B			PD	5/7/2007	For each type of thermometer and gage signed by product manufacturer
105	0	Water Samples: Domestic Water Piping Field Quality Control Test Reports:	15140	1.4-A			WS	5/7/2007	Specified in part 3 cleaning article
106	0	Domestic Water Piping	15140	1.4-B			FG	5/7/2007	
107	0	PD: Domestic Water Piping Specialties - Vacuum Breakers	15145	1.4-A1			PD	5/7/2007	Pipe applied atmospheric type vacuum breakers, Hose connection vacuum breakers, pressure vacuum breakers Reduced pressure principle backflow preventors, Beverage dispensing equipment backflow preventors, Carbonated beverage dispenser dual check valve backflow preventors, hose connection backflow preventors
108	0	PD: Domestic Water Piping Specialties - Backflow Preventors	15145	1.4-A2			PD	5/7/2007	Copper alloy calibrated balancing valves
109	0	PD: Domestic Water Piping Specialties - Balancing Valves	15145	1.4-A3			PD	5/7/2007	Individual fixture water mixing valves, Manifold thermostatic water mixing valve assemblies
110	0	PD: Domestic Water Piping Specialties - Temperature Actuated Water Mixing Valves	15145	1.4-A4			PD	5/7/2007	
111	0	PD: Domestic Water Piping Specialties - Strainers for Domestic Water Piping	15145	1.4-A5			PD	5/7/2007	Y-Pattern Strainers
112	0	PD: Domestic Water Piping Specialties - Outlet Box	15145	1.4-A6			PD	5/7/2007	Outlet Boxes
113	0	PD: Domestic Water Piping Specialties - Hose Bibbs	15145	1.4-A7			PD	5/7/2007	Hose Bibbs
114	0	PD: Domestic Water Piping Specialties - Drain Valves	15145	1.4-A8			PD	5/7/2007	Ball Valve Type Hose End Drain Valves
115	0	PD: Domestic Water Piping Specialties - Water Hammer Arresters	15145	1.4-A9			PD	5/7/2007	Water hammer arrester
116	0	PD: Domestic Water Piping Specialties - Air Vents	15145	1.4-A10			PD	5/7/2007	Bolted construction automatic air vents, welded construction automatic air vents

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117	0	PD: Domestic Water Piping Specialties - Trap Seal Primer Valves	15145	1.4-A11			PD	5/7/2007	Supply type trap seal primer valves for domestic water piping specialties to include in emergency, operation, and maintenance manuals
118	0	Operations and Maintenance Data - Domestic Water Piping Specialties	15145	1.4-A12			OM	8/6/2007	
119	0	PD: Sanitary Waste and Vent Piping - Hubless Cast Iron Soil Pipe and Fittings	15150	1.5-A1			PD	5/7/2007	Pipe and fittings, shielded couplings
120	0	PD: Sanitary Waste and Vent Piping - Copper Tube and Fittings	15150	1.5-A2			PD	5/7/2007	Copper DWV tube
121	0	PD: Sanitary Waste and Vent Piping - PVC Pipe and Fittings	15150	1.5-A3			PD	5/7/2007	Solid wall PVC pipe
122	0	PD: Drainage Piping Specialties - Cleanouts	15155	1.4-A1			PD	5/7/2007	Metal Floor Cleanouts
123	0	PD: Drainage Piping Specialties - Floor Drains	15155	1.4-A2			PD	5/7/2007	Floor Drains
124	0	PD: Drainage Piping Specialties - Floor Sinks	15155	1.4-A3			PD	5/7/2007	Floor Sinks
125	0	PD: Drainage Piping Specialties - Miscellaneous Drainage Piping Specialties	15155	1.4-A4			PD	5/7/2007	Open Drains, Deep Seal Traps, Floor Drain Trap Seal Primer Fittings
126	0	PD: Drainage Piping Specialties - Grease Interceptors	15155	1.4-A5			PD	5/7/2007	Grease Interceptors
127	0	Operations and Maintenance Data: Drainage Piping Specialties	15155	1.4-B			OM	8/6/2007	for drainage piping specialties to include emergency, operation, and maintenance manuals
128	0	PD: Plumbing Fixtures - Lavatory Faucets	15410	1.4-A1			PD	4/2/2007	Lavatory Faucet Type 1
129	0	PD: Plumbing Fixtures - Sink Faucets	15410	1.4-A2			PD	4/2/2007	Sink Faucet Type 2, Sink faucet type 1
130	0	PD: Plumbing Fixtures - Protective Shielded Guards	15410	1.4-A3			PD	4/2/2007	Protective shielding pipe enclosures
131	0	PD: Plumbing Fixtures - Fixture Supports	15410	1.4-A4			PD	4/2/2007	Lavatory Supports
132	0	PD: Plumbing Fixtures - Hot Water Dispensers	15410	1.4-A5			PD	4/2/2007	Hot water dispenser type 1
133	0	PD: Plumbing Fixtures - Lavatories	15410	1.4-A6			PD	4/2/2007	Lavatories L-1
134	0	PD: Plumbing Fixtures - Sinks	15410	1.4-A7			PD	4/2/2007	Sink S-1
135	0	PD: Plumbing Fixtures - Service Sinks	15410	1.4-A8			PD	4/2/2007	Service Sinks SS-1
136	0	Shop Drawings - Plumbing Fixtures	15410	1.4-B			SD	4/2/2007	Diagram power, signal, and control wiring
137	0	Operation and Maintenance Data: Plumbing Fixtures	15140	1.4-C			OM	8/6/2007	for plumbing fixtures to include emergency, operation, and maintenance manual
138	0	Warranty: Plumbing Fixtures	15140	1.4-D			WA	8/6/2007	Special warranty specified in this section
139	0	PD: Propeller Unit Heaters - Unit Heaters	15767	1.3-A1			PD	4/2/2007	Unit Heaters
140	0	PD: Propeller Unit Heaters - Casing	15767	1.3-A2			PD	4/2/2007	Cabinet, Cabinet Finish, Discharge Louver

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141	0	PD: Propeller Unit Heaters - Coils	15767	1.3-A3			PD	4/2/2007	Electric resistance heating elements
142	0	PD: Propeller Unit Heaters - Fan	15767	1.3-A4			PD	4/2/2007	Propeller type aluminum wheel directly mounted on motor shaft in the fan
143	0	PD: Propeller Unit Heaters - Fan Motors	15767	1.3-A5			PD	4/2/2007	venturi fan motors
144	0	PD: Propeller Unit Heaters - Control Devices	15767	1.3-A6			PD	4/2/2007	unit mounted thermostat
145	0	Operation and Maintenance Data: Propeller unit heaters	15767	1.3-B			OM	8/6/2007	for propeller unit heaters to include emergency, operation, and maintenance manuals
146	0	PD: Common Work Results for Electrical - Sleeve Seals	16051	1.4-A			PD	5/7/2007	Modular seal device designed to fill annular space between sleeve and raceway or cable
147	0	PD: Grounding and Bonding - Conductors	16060	1.3-A1			PD	5/7/2007	Insulated conductors, bare copper conductors
148	0	PD: Grounding and Bonding - Connectors	16060	1.3-A2			PD	5/7/2007	Bolted connectors for conductors and pipes, welded connectors
149	0	Qualification Data: Grounding and Bonding Field Quality Control Test Reports:	16060	1.3-C			QD	5/7/2007	For testing agency and testing agency's field supervisor
150	0	Grounding and Bonding	16060	1.3-D			FQI	5/7/2007	
151	0	Operations and Maintenance Data: Grounding and Bonding	16060	1.3-E			OM	8/6/2007	for grounding to include the following emergency, operations, and maintenance manuals
152	0	PD: Hangars and Supports for Electrical Systems - Support, Anchorage, and Attachment Components	16073	1.5-A1			PD	5/7/2007	Steel slotted support systems, Nonmetallic slotted support systems
153	0	Shop Drawings: Hangars and Supports for Electrical Systems	16073	1.5-B			SD	5/7/2007	Show fabrication and installation details and include calculations for trapeze hangers (include product data), steel slotted channel systems, nonmetallic slotted channel systems, equipment supports
154	0	Welding Certificates: Hangars and Supports for Electrical Systems	16073	1.5-C			WC	5/7/2007	Welding Certificates
155	0	PD: Electrical Identification - Raceway Cable Identification Materials	16075	1.3-A1			PD	5/7/2007	Self adhesive vinyl labels
156	0	PD: Electrical Identification - Conductor and Communication and Control Cable Identification Materials	16075	1.3-A2			PD	5/7/2007	Color Coding Conductor Tape
157	0	PD: Electrical Identification - Instruction Signs	16075	1.3-A3			PD	5/7/2007	Engraved, laminated acrylic or melamine plastic signs
158	0	PD: Electrical Identification - Equipment Identification Labels	16075	1.3-A4			PD	5/7/2007	Engraved, laminated acrylic or melamine label
159	0	PD: Electrical Identification - Miscellaneous Identification Products	16075	1.3-A5			PD	5/7/2007	Cable Ties, Paint, Fasteners for Labels and Signs

Number	Revision	Description	Specification Section	Sub Section	Responsible Company ID	Supplier	Type ID	Due Date	Notes
160	0	Identification Schedule: Electrical Identification	16075	1.3-B			IS	5/7/2007	An index of nomenclature of electrical equipment and system components used in identification signs and labels
161	0	Product Samples: Electrical Identification	16075	1.3-C			PS	5/7/2007	For each type of label and sign
162	0	PD: Conductors and Cables - Conductors and Cables	16120	1.4-A1			PD	5/7/2007	Copper Conductors, Conductor Insulation, Multiconductor Cable
163	0	PD: Conductors and Cables - Connectors and Splices	16120	1.4-A2			PD	5/7/2007	Connectors and Splices
164	0	Qualification Data: Conductors and Cables	16120	1.4-B			QD	5/7/2007	for testing agency
165	0	Field Quality Control Test Reports: Conductors and Cables	16120	1.4-C			FQ	8/6/2007	
166	0	PD: Raceways and Boxes - Metal Conduit and Tubing	16130	1.4-A1			PD	5/7/2007	Rigid Steel Conduit, EMT, FMC, LFMC, Fittings for conduits EMT and Cable, Joint Compound for rigid steel conduit
167	0	PD: Raceways and Boxes - Metal Wireways	16130	1.4-A2			PD	5/7/2007	Wireways, fittings and accessories, wireway covers
168	0	PD: Raceways and Boxes - Surface Raceways	16130	1.4-A3			PD	5/7/2007	Surface metal raceways
169	0	PD: Raceways and Boxes - Boxes, Enclosures, and Cabinets	16130	1.4-A4			PD	5/7/2007	Sheet Metal outlet and device boxes, Cast metal outlet and device boxes, metal floor boxes, small sheet metal pull and junction boxes, Cast metal access pull and junction boxes, Hinged cover enclosures, cabinets for custom enclosure cabinets, handholes and boxes for underground wiring duct entry provisions including location and duct sizes, frame and cover designs, grounding details, dimensioned locations of cable rack inserts and pulling in and lifting irons, joint details
170	0	Shop Drawings: Raceways and Boxes	16130	1.4-B			SD	5/7/2007	Conduit routing plans, drawn to scale, on which structural members and support, HVAC items, Plumbing items, and architectural features in the path of conduits for professional engineer and testing agency
171	0	Coordination Drawings: Raceways and Boxes	16130	1.4-C			GD	5/7/2007	
172	0	Qualification Data: Raceways and Boxes	16130	1.4-D			QD	5/7/2007	
173	0	Source Quality Control Test Reports: Raceways and Boxes	16130	1.4-E			TR	8/6/2007	
174	0	PD: Wiring Devices - Straight Blade Receptacles	16140	1.4-A1			PD	5/7/2007	Convenience receptacles, 125V, 20A
175	0	PD: Wiring Devices - GFCI Receptacles	16140	1.4-A2			PD	5/7/2007	Duplex GFCI convenience receptacles

Number	Revision	Description	Specification Section	Sub Section	Responsible Company ID	Supplier	Type ID	Due Date	Notes
176	0	PD: Wiring Devices - Hazardous (classified) Location Receptacles	16140	1.4-A3			PD	5/7/2007	Wiring devices for hazardous (classified) locations
177	0	PD: Wiring Devices - Twist Locking Receptacles	16140	1.4-A4			PD	5/7/2007	Single convenience receptacles
178	0	PD: Wiring Devices - Pendant Cord Connector Devices	16140	1.4-A5			PD	5/7/2007	
179	0	PD: Wiring Devices - Cord and Plug Sets	16140	1.4-A6			PD	5/7/2007	
180	0	PD: Wiring Devices - Snap Switches	16140	1.4-A7			PD	5/7/2007	Switches. Pilot light switches, key operated lighting switches
181	0	PD: Wiring Devices - Communications Outlets	16140	1.4-A8			PD	5/7/2007	Telephone outlet
182	0	PD: Wiring Devices - Wall Plates	16140	1.4-A9			PD	5/7/2007	Single and combination types to match corresponding wiring devices
183	0	Shop Drawings - Wiring Devices Field Quality Control Test Reports: Wiring	16140	1.4-B			SD	5/7/2007	List of legends and descriptions of materials and processes used for premarking wall plates
184	0	Devices	16140	1.4-C			FQ	8/6/2007	
185	0	Operation and Maintenance Data: Wiring Devices	16140	1.4-D			OM	8/6/2007	for wiring devices to include all manufacturers packing label warnings and instruction manuals that include labeling conditions
186	0	PD: Lighting Control Devices - Time Switches	16145	1.3-A1			PD	5/7/2007	electronic time switches
187	0	PD: Lighting Control Devices - Conductors and Cables	16145	1.3-A2			PD	5/7/2007	Power wiring to supply side of remote control power sources, Class 2 and 3 control cable, class one control cable
188	0	Field Quality Test Controls - Lighting Control Devices	16145	1.3-B			FQ	5/7/2007	
189	0	Operation and Maintenance Data: Lighting Control Devices	16145	1.3-C			OM	5/7/2007	for each type of product to include in maintenance manuals
190	0	PD: Enclosed Switches and Circuit Breakers - Fusible and Non-Fusible Switches	16410	1.4-A1			PD	5/7/2007	Fusible Switch, Non-Fusible Switch, Accessories
191	0	PD: Enclosed Switches and Circuit Breakers - Molded Case Circuit Breakers and Switches	16410	1.4-A2			PD	5/7/2007	Molded case circuit breakers, molded case circuit breaker Features and accessories
192	0	PD: Enclosed Switches and Circuit Breakers - Enclosures	16410	1.4-A3			PD	5/7/2007	
193	0	Shop Drawings: Switches and Enclosed Breakers	16410	1.4-B			SD	5/7/2007	Diagram power, signal, and control wiring
194	0	Qualification Data: Switches and Enclosed Breakers	16410	1.4-C			QD	5/7/2007	for testing agency

Number	Revision	Description	Specification Section	Sub Section	Responsible Company ID	Supplier	Type ID	Due Date	Notes
195	0	Field Quality Control Test Reports: Switches and Enclosed Breakers	16410	1.4-D			FQ	8/6/2007	Include test procedures used, test results that comply with requirements, results of failed tests and corrective action taken to achieve test results that comply with requirements
196	0	Operation and Maintenance Data: Switches and Enclosed Breakers	16410	1.4-F			OM	8/6/2007	for enclosed switches and circuit breakers to include in emergency, operations, and maintenance manuals
197	0	PD: Interior Lighting - Lighting Fixtures and Components	16511	1.4-A1			PD	4/2/2007	Recessed fixtures, fluorescent fixtures, HID fixtures, Metal Parts, Sheet Metal Components, Doors Frames and Other internal Access, Plastic diffusers covers and globes
198	0	PD: Interior Lighting - Ballasts for Linear Fluorescent Lamps	16511	1.4-A2			PD	4/2/2007	Electronic Ballasts, Electromagnetic ballasts, single ballast for multiple lighting fixtures, ballast for low temperature environments
199	0	PD: Interior Lighting - Fluorescent Lamps	16511	1.4-A3			PD	4/2/2007	Low mercury lamps, T8 rapid start low mercury lamps
200	0	PD: Interior Lighting - Lighting Fixture Support Components	16511	1.4-A4			PD	4/2/2007	Single stem hangers, twin stem hangers, wires, wires for humid space, rod hangers, hook hangers
201	0	Shop Drawings - Interior Lighting	16511	1.4-B			SD	4/2/2007	Wiring Diagrams, Power and control lighting
202	0	Product Certificates: Interior Lighting	16511	1.4-C			PC	4/2/2007	for each type of ballast and fixture signed by manufacturer
203	0	Qualification Data: Interior Lighting	16511	1.4-D			QD	4/2/2007	for agencies providing photometric data for lighting fixtures
204	0	Field Quality Control Test Report: Interior Lighting	16511	1.4-E			FQ	8/6/2007	
205	0	Operations and Maintenance Data: Interior Lighting	16511	1.4-F			OM	8/6/2007	for lighting equipment and fixtures to include in emergency, operation, and maintenance
206	0	Warranties: Interior Lighting	16511	1.4-G			WA	8/6/2007	special warranties specified in this section
207	0	PD: Exterior Lighting - Luminaires	16521	1.5-A1			PD	4/2/2007	Luminaires, metal parts, sheet metal components, housings, doors frames and other internal access, exposed hardware materials, plastic parts, light shields, lenses and refractor gaskets, luminaire finish, factory applied finish for steel luminaires, factory applied finish for aluminum luminaires

<u>Number</u>	<u>Revision</u>	<u>Description</u>	<u>Specification Section</u>	<u>Sub Section</u>	<u>Responsible Company ID</u>	<u>Supplier</u>	<u>Type ID</u>	<u>Due Date</u>	<u>Notes</u>
208	0	PD: Exterior Lighting - Fluorescent Ballasts and Lamps	16521	1.5-A2			PD	4/2/2007	low temperature ballast capability, low temperature lamp capability, fluorescent lamps
209	0	PD: Exterior Lighting - Ballasts for HID Lamps	16521	1.5-A3			PD	4/2/2007	
210	0	PD: Exterior Lighting - HID Lamps	16521	1.5-A4			PD	4/2/2007	metal halide lamps
211	0	Qualification Data: Exterior Lighting Field Quality Control Test Reports: Exterior Lighting	16521	1.5-B			QD	4/2/2007	for agencies providing photometric data for lighting fixtures
212	0	Warranty: Exterior Lighting	16521	1.5-C			FC	8/6/2007	
213	0	Warranty: Exterior Lighting	16521	1.5-D			WA	8/6/2007	special warranty specified in this section

**SECTION 01360
COORDINATION (GENERAL)**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 COORDINATION OF WORK/COOPERATION

- A. Each **Contractor** shall recognize the complex nature of the Project, the sequential nature of contracts and the concurrent and ongoing operations of the Owner and other **contractors** with the Work of this Project. All **Contractors** are required to review, discuss and coordinate their Work with the Work of other **contractors** as well as Barton Malow Company with regard to sequence, timing, built-in Work and equipment, layout, location, compatibility of materials and sizes and required clearances prior to beginning the work to avoid construction delays which impact the Owner's occupancy of the facility. Since the Work of each **Contractor** will depend upon interface with the Work of other **contractors**, changes in the scheduling, procedures, Work or Project conditions of a **Contractor** may affect the scheduling procedures, Work or Project conditions of other **contractors**.
- B. Each **Contractor** shall coordinate construction operations in various sections of the technical specifications to assure efficient and orderly installation of each part of the Work that depends on each other for proper installation, connection, fit and operation. Each **Contractor** shall:
1. Schedule operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 3. Make provisions to accommodate items scheduled for later installation.
 4. Provide to all other trades all information (drawings, diagrams, templates, embedments, etc.) necessary for the coordination of the Work.
- C. The completion of the Project within the prescribed time is dependent upon the close and active cooperation and open discussions of all those involved, therefore, it is expressly understood and agreed that each **Contractor** shall layout and install its Work at such time and in such manner as not to delay or interfere with the carrying forward of the Work of other **contractors**. Observation of the Work by others shall not relieve **Contractor** from its responsibility for coordination, supervision, or scheduling and direction of the Work.
- D. **Contractors** are to report in a prompt manner any interferences, discrepancies or incompatibilities discovered to Barton Malow Company, whose decision as to the **Contractor** at fault and as to the manner in which the matter may be resolved, shall be binding and conclusive on **Contractors** involved. Barton Malow Company may direct layout/ location changes as required to make the entire work fit together. Reasonable changes of this nature will not entitle any **Contractor** to an increase in contract price.
- E. Failure of a **Contractor** to notify other **contractors** and Barton Malow Company of a potential interference, incompatibility, or discrepancy and any failure to coordinate Work with that of other **contractors** prior to installation and/or fabrication shall be at the **Contractor's** risk.

- F. Due to the nature of the Owner's existing areas, the sequence of Work must be scheduled and coordinated with the Owner's ongoing operations to minimize disruptions and/or disturbances to the Owner's Work and at all times shall remain as secondary to the Owner's Work. Each segment of the Work shall be coordinated with Barton Malow Company prior to proceeding.

END OF SECTION 01360

**SECTION 01400
QUALITY REQUIREMENTS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Specific attention is directed to the requirements described in Section 01450 Testing and Inspection Services.

1.02 DOCUMENT CONTROL PROCEDURE

Each Contractor is to provide Barton Malow Company its document control procedure to include drawing submittals and surveillance. In the absence of such a procedure, the Contractor will use the following procedure for document control.

“A log is maintained identifying the drawing revision status, issue date and distribution (internal and external). The transmittal issuing the changed documents will indicate what changes are made and indicate that the documents are approved for use. Contractor meetings include a review of approved drawings. The review is documented in the meeting minutes. Superintendent surveillance activities include monitoring Contractor drawing use.”

1.03 QUALITY CONTROL

- A. Each Contractor is responsible to provide the Owner with a completed quality product for its Work. Each Contractor shall be responsible for any costs associated with re-testing and re-performing the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.
- B. All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Each Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.
- C. The Contractor shall provide Barton Malow Company, Owner and Architect access to the Work in preparation and progress wherever the Work is located at all reasonable times.
- D. Barton Malow Company and the Architect will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed. The Architect shall make all decisions with respect to questions concerning the quality or fitness of materials, equipment and workmanship.
- E. Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Barton Malow Company to withhold payment or any other means deemed necessary to correct non-conforming Work.
- F. The Barton Malow Company may/will employ without cost to the Contractors, a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner, Barton Malow Company and/or the Architect to determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.

- G. The testing firm will report directly to the Barton Malow Company. Copies of test and inspection reports will be furnished to the appropriate Contractors. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials, which are not in compliance with the requirements of the Contract Documents.
- H. Each Contractor shall cooperate with the testing firm and provide labor to assist with sample preparations where applicable.

1.04 NOTICE OF NON-CONFORMANCE

- A. Barton Malow Company may conduct observations/evaluations of the Contractor's Work. Barton Malow Company and/or Architect's reviews do not relieve the Contractor from compliance with the Contract Documents or necessary corrections for deficiencies thereof. Contractors whose Work does not meet the standards set by the Contract Documents will be notified by representatives of the Barton Malow Company using a Notice of Non-Conformance Form. The Contractor, upon receipt of the Notice of Non-Conformance, shall complete and return the form and provide the corrective actions necessary in a timely manner as outlined on the Notice of Non-Conformance.
- B. Control of nonconforming product: The Contractor shall establish and maintain documented procedures to ensure that product that does not conform to specified requirements is prevented from unintended use or installation. This control shall provide for identification documentation, evaluation, segregation (when practical), disposition of nonconforming product, and for notification to the functions concerned.
- C. Review and disposition of nonconforming Work: Nonconforming product shall be reviewed in accordance with documented procedures. It may be
 - a) reworked to meet the specified requirements,
 - b) accepted with or without repair by concession,
 - c) regraded products for alternative applications, or
 - d) reject or scrap and dispose of nonconforming work and replace
- D. The **Corrective Action Report (CAR) (CON 18.2)** is in Section 01600 Forms.

1.05 CONTRACTOR PERFORMANCE EVALUATION

- A. Barton Malow Company will be evaluating Contractor's performance and will provide feedback during the life of the Project, on Contractor's performance, for the purpose of improving Barton Malow Company's Contractor selection process for future project endeavors.
- B. Contractors will be requested to evaluate and provide feedback to Barton Malow Company on ways for improve on processes affecting the Contractors. None of these evaluations or feedback shall form part of the Agreement or Contract Documents.
- C. This Contractor Performance Evaluation form is generated by the CPS Database.

END OF SECTION 01400

**SECTION 01450
TESTING AND INSPECTION SERVICES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Except as indicated in this Section, refer to the various technical specification sections for specific testing requirements.

1.02 SCOPE OF INDEPENDENT TESTING LABORATORY SERVICES

- A. The Barton Malow Company will employ and pay for the services of an Independent Testing and Inspection Laboratory to perform the following testing (unless additional testing is required in the specifications).
 - Soils
 - Concrete
 - Steel
 - Paving
 - Roofing
 - Masonry
- B. Testing Laboratory inspection, sampling and testing is required as identified in the technical specifications.

1.03 QUALIFICATION OF TESTING AND INSPECTION LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by AMERICAN COUNCIL OF INDEPENDENT LABORATORIES.
- B. Meet basic requirements of ASTM E-329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used In Construction" and ASTM D3740.
- C. Authorized to operate in the State in which the Project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of NATIONAL BUREAU OF STANDARDS during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- E. Testing Equipment:
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
 - a. NATIONAL BUREAU OF STANDARDS.
 - b. Accepted values of natural physical constants.

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Each Contractor shall be responsible to provide and pay for all other testing associated with its scope of Work. Tests shall be made by a qualified independent testing agency approved by the Owner and

Architect. Coordinate selection of the testing agency through the Barton Malow Company. The Contractor shall arrange and pay for the following services:

1. Inspections and tests specified as the Contractor's responsibility in the various sections of the Specifications.
 2. Inspections and tests required by the General Conditions including those tests required by codes, ordinances, or the approval authority of regulatory agencies.
 3. Inspection and tests performed for the Contractor's convenience.
- B. Contractor shall cooperate with the laboratory to facilitate the execution of its required services. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work.
- C. Contractor testing shall as a minimum comply with the requirements of this section.
- D. The Contractor is responsible to pay the cost of additional testing in the event that additional testing of the Contractor's materials, installation, and other Work is required by the independent testing laboratory because of test results not in compliance with the Contract Documents and/or additional testing required as a result of Contractor's negligence or poor workmanship.

PART 2 - EXECUTION

2.01. TESTING AND INSPECTION LABORATORY DUTIES

- A. Unless otherwise noted, the testing agency shall provide all required personnel and equipment as required for inspections and tests, for obtaining specimens and samples, and for delivery of specimens and samples to the laboratory when required.
- B. The Testing Laboratory shall cooperate with Barton Malow Company to provide qualified personnel after due notice.
- C. The Testing Laboratory shall perform specified inspections, sampling and testing of materials and methods of construction in accordance with specified standards and shall ascertain compliance of materials with the requirements of the Contract Documents.
- D. The Testing Laboratory shall promptly notify Barton Malow Company of observed irregularities or deficiencies of work or products.
- E. The Testing Laboratory shall promptly submit written report(s) of each test and inspection; submit one copy of report each to the Architect, Barton Malow Company, Owner, and Contractor with the following:
 1. Date issued.
 2. Project title and number.
 3. Testing laboratory name, address and telephone number.
 4. Name and signature of laboratory inspector.
 5. Date and time of sampling or inspection.
 6. Record of temperature and weather conditions.
 7. Date of test.
 8. Identification of product and specification section.
 9. Location of sample or test in the Project.
 10. Type of inspection or test.
 11. Results of tests and compliance with Contract Documents.
 12. Interpretation of test results, when requested by Architect.

2.02 LIMITATIONS OF AUTHORITY OF TESTING AND INSPECTION LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of the Work, but may provide an expert opinion whereby the Owner, Architect and Barton Malow Company may make an informed decision as to acceptance or rejection.
 - 3. Perform any duties of the Contractor.
 - 4. Stop the Work.

PART 3 – CONTRACTOR RESPONSIBILITIES

3.01 CONTRACTOR SHALL:

- A. Cooperate with laboratory personnel, provide access to Work, to Manufacturer's operations.
- B. Secure and deliver to Barton Malow Company adequate quantities of representative samples of materials proposed to be used of which require testing.
- C. Provide to Barton Malow Company the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by testing laboratory.
- D. Furnish copies of Products test reports as required.
- E. Furnish incidental labor and facilities as follows:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify Barton Malow Company sufficiently in advance of operations (24 hours minimum) to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Barton Malow Company for laboratory personnel and travel expenses and all of Barton Malow Company's other expenses incurred arising out of or resulting from Contractor's negligence.
- G. Employ and pay for the services of testing laboratory to perform additional inspections, sampling and testing required:
 - 1. For the Contractor's convenience.
 - 2. When initial tests indicate Work does not comply with Contract Documents.
- H. When the Contractor is providing the testing and prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered engineer and responsible officer.

Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards (NBS) during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

3.02 RE-TEST RESPONSIBILITY

- A. Where the results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with the requirements of the Contract Documents, the re-tests shall be the responsibility of the Contractor regardless of whether the original test was the Contractor's responsibility.
- B. Re-testing of Work revised or replaced by the Contractor is the Contractor's responsibility where required tests were performed on original Work. All costs and fees for re-testing shall be paid by the Contractor.
- C. Schedule delays and costs which are the result of non-conforming work or remedy will be the responsibility of the offending Contractor.

END OF SECTION 01450

**SECTION 01510
FIRE PRECAUTIONS AND PROTECTION**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
1. Fire Precautions and Protection/Noxious Odors and Fumes
 2. (Temporary) Fire Standpipe System
 3. Noxious Odors and Fumes

PART 2 - FIRE PRECAUTIONS AND PROTECTION

2.01 FIRE PRECAUTIONS AND PROTECTION

- A. All **Contractors** and their Subordinate Parties shall assume full responsibility and take all necessary precautions to guard against and eliminate all possible fire hazards and to prevent damage to any construction work, building materials, equipment, temporary field offices, storage sheds, and all other property, both public and private. The location of the nearest corporation or public fire alarm box and the telephone number of the local fire department shall be conspicuously posted by **Contractor** throughout the field offices and in the building structure adjacent to its Work and it shall take precautions to prevent fire hazards in accordance with all fire protection and prevention laws and codes.
- B. Each **Contractor's** superintendent in charge at the Project, shall review the entire Project at least once a week to make certain the **Contractor** has adhered to the conditions and requirements set forth herein.
- C. No open fires shall be permitted. **Contractors** and their Subordinate Parties shall not be allowed to start fires with gasoline, kerosene or other highly flammable materials.
- D. Welding, flame cutting, or other operations involving the use of flame, arcs, or sparking devices will not be allowed without adequate protection and shielding without prior permission of the Owner through the Barton Malow Company. All combustible and flammable material shall be removed from the immediate area. Material shall be protected with a fire resistant tarpaulin to prevent sparks, flames, or hot metal from reaching materials. **Contractor** shall provide the necessary personnel and fire fighting equipment to effectively control incipient fires resulting from welding, flame cutting, or other operations involving the use of flame, arcs or sparking devices. Each **Contractor** performing Work involving welding or open flame shall provide its own fire extinguishers in the immediate area of the Work.
- E. Not more than a one day supply of flammable liquids such as oil, gasoline, paint or paint solvent shall be brought into any building at any one time. All flammable liquids having a flash point of 110 degrees F or below, which must be brought into any building, shall be confined to Underwriter's Laboratories' labeled safety cans. The bulk supply of all flammable liquids shall be detached at least 75 feet from the building and from yard storage of building materials. Spigots on drums containing flammable liquids are prohibited on the project site. Drums are to be equipped with approved vent pumps.
- F. Combustible materials shall not be stored or left overnight within the confines of the permanent building. This includes all internal combustion engines using gas or fuel oil. Hoisting of flammable or combustible materials to the roof shall only be in quantities as needed for immediate use.
- G. Only fire resistant tarpaulins shall be used on this Project.

- H. The permanent fire protection water supply, fire extinguishing equipment, shut down and tie-ins between new and existing fire protection system shall be coordinated with the Owner and Barton Malow Company and be installed at the earliest possible date. Shut down of an existing fire protection system shall be for a minimum period of time. As each sprinkler system is completed and placed in service, the control valve shall be sealed. Permission to break seals and close sprinkler valves shall be given only by Barton Malow Company with approval of the Owner.
- I. Barton Malow Company will provide and maintain in working order at all times during construction not less than four (4) fire extinguishers conveniently located for each floor area having 50,000 square feet or less. One (1) additional fire extinguisher will be provided for each additional 15,000 square feet of floor area.
- J. Fire extinguishers provided by Barton Malow Company and Contractors shall be "all purpose", and not a water type, to meet the approval of the Fire Underwriter's Laboratory, and will be inspected at regular intervals and recharged if necessary.
- K. In areas of flammable liquids, asphalt or electrical hazards, extinguishers of the 15 lb. carbon dioxide type or 20 lb. dry chemical type shall be provided by the **Contractor** creating such hazard.
- L. Each **Contractor** agrees that, in the event of fire, all its workers and all Subordinate Parties workers anywhere on site will assist in extinguishing the fire.
- M. **Contractor's** and their Subordinate Parties' shanties of combustible construction shall not be placed inside of any structure. Such shanties shall be detached at least seventy-five (75) feet from the building or as directed by the Barton Malow Company with approval of the Owner. Totally incombustible shanties may be, if approved in writing by Barton Malow Company, located inside of the structure.
- N. Use of only Underwriter's Laboratory approved heaters and/or stoves is permitted in field offices or storage sheds and they shall have fire resistive material underneath and at the sides near partitions and walls. Pipe sleeves and covering shall be used where stove pipe runs through walls or roof.
- O. Flammable portions of construction shanties inside the structure must be painted inside and outside with "ALBI" fire retardant paint or other fire retardant paint of equal quality as approved by the Owner.

2.02 (TEMPORARY) FIRE STANDPIPE SYSTEM

- A. Permanent risers shall be installed as floor slabs are cast, with capped 2 1/2 inch hose valves on each floor and temporary cap or plug on top. One riser at a time shall be extended up so that remainder are available for use at all times.
- B. Provide permanent cross connections or provide temporary cross connections.

2.03 NOXIOUS ODORS AND FUMES

- A. All Contractors are notified that combustion engine equipment, tar kettles and any other items causing noxious odors or fumes will NOT be allowed in the building or near air intake louvers. If intake louver locations are in doubt, consult with Barton Malow Company.

END OF SECTION 01510

SECTION 01520
TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. This Section describes the following requirements including:
1. Project Signage
 2. Snow Removal
 3. Security
 4. Temporary Field Office, Facilities and Parking
 5. Temporary Fencing
 6. Temporary Toilet Facilities
 7. Drinking Water/Temporary Water
 8. Roof Protection
 9. Scaffolding
 10. Water Control
 11. Temporary Material Hoist/Elevator
 12. (Temporary) Fire Standpipe System (see Section 01510 Fire Precautions and Protection)
 13. Temporary Stairs, Ladders, Ramps, Runways, and Barricades
 14. Temporary Electrical Power and Light
 15. Temporary Heating , Cooling and Weather Protection
 16. Temporary Enclosures

PART 2 - CONSTRUCTION FACILITIES**2.01 PROJECT SIGNAGE**

- A. The **Barton Malow Company** shall provide a project sign. No other signs or advertising shall be displayed on the premises without the approval of the Architect, Owner, and Barton Malow Company. This does not exclude the posting of required trade notice and cautionary signage by **Contractor's**.

2.02 SNOW REMOVAL

- A. **Contractors** performing Work under exposed conditions shall remove snow and ice for the protection and execution of their Work. Keeping public traffic areas and circulation routes free of snow shall be the responsibility of the **Barton Malow Company**.

2.03 SECURITY

- A. The services of a security guards **will not** be provided by **either the Owner or Barton Malow Company**.
- B. Each **Contractor**, at its own cost and expense, may provide security guard, protective service or other means of site security as it deems necessary.
- C. **Contractors** shall advise Barton Malow Company of any theft or damage which might delay the execution of the Work and furnish the Owner and Barton Malow Company with a copy of any theft report filed with local, county or state agencies.

- D. Neither Barton Malow Company nor Owner assumes any responsibility for loss, theft or damage to the **Contractor's** materials or for damage to Work in place before the completion of the construction. In the instance of any such loss, theft or damage, the **Contractor** shall be responsible to renew, restore or remedy the Work, tools, equipment and construction in accordance with requirements of the Contract Documents without additional cost to Barton Malow Company.
- E. Barton Malow Company is not responsible for damage, liability, theft, casualty or other hazard to the automobiles or other vehicles, nor to injury, including death, to occupants of automobiles or other vehicles on the Owner's property.
- F. Barton Malow Company may establish additional security policies and procedures. All **Contractors** will be required to cooperate with Barton Malow Company in implementing these procedures.
- G. Site-parked equipment, operable machinery and hazardous parts of the new construction subject to mischief and accidental operation shall be inaccessible, locked or otherwise made inoperable when left unattended.

2.04 TEMPORARY FIELD OFFICE, FACILITIES AND PARKING

- A. The Owner **shall** designate **an area** for construction trailers. Placement and scheduled duration shall be coordinated by Barton Malow Company. Each **Contractor** is responsible to verify that all field offices, trailers and storage sheds shall be in accordance with the local Fire Marshal having jurisdiction. Each **Contractor** shall arrange and pay for its own telephone hookup and use. Each **Contractor** shall arrange and pay for its own temporary electrical hook-up, water and toilets. The **Contractor** shall pay for all power used for the **Contractor's** temporary field office and temporary electrical service. Construction personnel **will** be allowed to use the existing Owner parking facilities. Designated **Contractors will** be allowed to have on-site construction trailers. Construction trailers shall be limited to **10' x 30'** or smaller.
- B. **Contractors** shall maintain the use of designated space for offices and sheds. This includes removal of weeds, debris, trash and clean-up of the area after removal of such temporary structures.
- C. Temporary field offices and sheds shall not be used for living quarters. .
- D. Offices and sheds shall be of suitable design, maintenance and appearance, and meet the approval of Barton Malow Company and all applicable local codes and ordinances.
- E. All temporary offices and sheds including foundations, must be removed within ten (10) days of written notice from Barton Malow Company including restoration of grade. Structures not removed in a timely manner will be removed by Barton Malow Company at **Contractor's** expense.

PART 3 - TEMPORARY CONSTRUCTION CONTROLS

3.01 TEMPORARY FENCING

- A. The **Barton Malow Company shall** provide temporary fencing with gates for required access and remove same at the completion of the Project.
- B. The **Contractors** shall repair or replace fencing damaged as a result of its operation. **Contractors** shall remove and replace fencing and gates required to provide access for oversized items.
- C. **Contractor's personnel are not allowed to work outside of the construction fence without permission of the Barton Malow Company.**

3.02 TEMPORARY TOILET FACILITIES

- A. The **Barton Malow Company** shall provide and maintain temporary toilet facilities for the construction of the Project. The use of the Owner's existing permanent facilities is as described in Section 01140 Use of Premises.
- B. **During renovation activities, Barton Malow Company may obtain, through the Owner, permission to use designated toilet facilities within the contract boundaries for construction use. The use of the Owner's existing permanent facilities outside the construction boundaries is strictly not allowed.**

3.03 DRINKING WATER/TEMPORARY WATER

- A. The Owner will pay for water used on this Project.
- B. Immediately after award of the Agreement, the **Mechanical Contractor** shall furnish, install, maintain and subsequently remove a temporary hookup to the Owner's potable water system where directed by Barton Malow Company for construction purposes. The **Contractor** shall provide all temporary piping and approved backflow prevention as necessary for distribution from the source. Distribution of temporary water will be paid for by **Contractors** requiring same. A minimum of One (1) hose bibs shall be provided **within the fenced construction area** by the **Contractor** as directed by Barton Malow Company.

3.04 ROOF PROTECTION

- A. **Contractors** and their Subordinate Parties, shall be responsible for damages to roofing, sheet metal and roof structure while performing Work. The Roofing **Contractor** will perform the repair Work at the expense of the **Contractor** responsible for the damage.
- B. **All Contractors will protect adjacent existing roof surfaces while performing their Work. No construction materials will be allowed to be placed on existing roof surfaces without prior approval of the Owner through the Barton Malow Company.**

3.05 SCAFFOLDING

- A. Each **Contractor** is responsible for providing and maintaining any and all ladders, scaffolds and other staging as required to complete its Work. All such ladders, scaffolds and staging equipment shall be erected, maintained and subsequently removed by each **Contractor** in accordance with all applicable safety laws, rules and regulations.

3.06 WATER CONTROL

- A. All pumping, bailing or well point equipment necessary to keep excavations and trenches free from the accumulation of water during the entire excavating and backfilling progress of the Work shall be the responsibility of the **Contractor** performing said excavations and trenches due to its scope of Work.
- B. **The Sitework Contractor** shall be responsible for keeping the building at grade and below free from water from the time the building backfill is completed until the building is watertight.
- C. Dispose of water in such a manner as will not endanger public health or cause damage or expense to public or private property. Abide by the requirements of any public agencies having jurisdiction.

3.07 TEMPORARY MATERIAL HOIST/ELEVATOR

- A. **Each Contractor is responsible for its own hoisting and material equipment movement costs as required to complete the Work under its Agreement.**

3.07 TEMPORARY MATERIAL HOIST/ELEVATOR (Cont'd)

- B. Barton Malow Company may operate and maintain a permanent elevator until such time as all material hoisting requirements have been met. Elevator requirements in excess of the capacity or size of this elevator shall be provided by each **Contractor** at its expense. This elevator shall not be used for the placement of concrete, the transporting of workers, or other means inconsistent with its use as directed by Barton Malow Company. The operating cost for all overtime use of the elevator shall be paid by the **Contractor** requiring such services.
- C. The Elevator **Contractor** shall be obligated to extend warranty and guarantee periods on any permanent equipment used prior to Substantial Completion.
- D. Transportation of construction materials through the Owner's facility shall be accomplished in accordance with the requirements described in Section 01140 Use of Premises in such a manner so as to:
 - 1. Not damage any of the existing facility.
 - 2. Not impair the Owner's use of the facility.
 - 3. Not create any type of mess or additional cleaning requirements in Owner occupied areas.

3.08 TEMPORARY STAIRS, LADDERS, RAMPS, RUNWAYS, AND BARRICADES

- A. Each **Contractor** is to provide and maintain all necessary temporary stairs, ladders, ramps, and runways to facilitate conveyance of workers, materials, tools, and equipment for proper execution of its Work. All protection and safety barricades, devices, covers, and all other necessary items shall be provided by each **Contractor** as it relates to the safe conduct of its Work and protection of people and property in its Work area in accordance with applicable law.
- B. Any **Contractor** or Subordinate Party performing excavation Work shall be responsible to furnish, install and maintain temporary barricades and/or fencing of all open excavations until such time as the backfilling is complete. Flasher lights shall be provided on barricades and fencing by the **Contractor** as requested by Barton Malow Company and in accordance with applicable law. As a minimum, all barricades across roads and walks shall have lights on them in working condition.
- C. The Structural Steel **Contractor** shall provide temporary guardrails at the building floor perimeters, interior shafts, all roof areas, or other openings, immediately after the erection of the **steel** frame and with the installation of **metal** decking. Protection shall be OSHA 29 CFR Part 1926.502 (B) "Guardrail Systems" and shall include but not be limited to two line rails and toe boards. This temporary protector shall be left in place after completion of the **steel** frame for the use of all other **Contractors**. The Structural Steel **Contractor** shall maintain and remove said guardrails and patch concrete. Each **Contractor** that disturbs any temporary protection for its Work is responsible to protect the area during its Work and to reinstall to its original condition the guardrail or barricade system for the protection of the workers and others until final construction of perimeter exterior wall and/or shaft openings is completed. All other protection and safety barricades, devices, covers, etc. shall be provided by this **Contractor** as it relates to the safe conduct of its Work in accordance with all local, state and federal regulations and the requirements of the Contract Documents, and shall be in accordance with the most stringent requirements.
- D. Each **Contractor** and its Subordinate Parties shall provide and maintain in good repair barricades, overhead protection, guard rails, etc., as required by law or necessary for the protection of the public and personnel engaged in the Work from hazards incidental to performance of the Work. **Contractor** shall do everything necessary to protect the Owner's employees, the public and workers from injuries and to protect vehicles and other property from damage.

3.09 TEMPORARY ELECTRICAL POWER AND LIGHT

A. Electrical Energy Costs

1. The Owner **will** pay for electrical energy to operate temporary electrical power and lighting for the duration of the project at designated locations. Temporary power **will** be provided free of charge.

B. Power Source

1. The Electrical **Contractor** shall provide, install, and pay for labor, equipment and materials required to make connections to **the local utility company** and to provide temporary electrical power and light distribution. The Electrical **Contractor** shall coordinate the location of the electrical power and lighting as directed by Barton Malow Company.
2. The Electrical **Contractor** will provide for **each** construction trailer(s) a 120/208 volt (or 120/240 volt), 100 ampere single phase power source to which the **Contractor** who occupies the trailer may connect. The cost of hook up and removal of temporary electrical service to trailer shall be each **Contractor's** responsibility.
3. Protection shall be provided for the power supply source complete with disconnect switch and other required electrical devices.

C. Rules and Regulations:

1. All temporary equipment and wiring for power, lighting and distribution requirements shall conform to OSHA requirements and be in accordance with applicable provisions of governing laws, codes, and ordinances.
2. All temporary wiring and distribution equipment shall be maintained so as not to constitute a hazard to persons or property.
3. Each **Contractor** is responsible to provide an assured grounding program in accordance with OSHA regulations for their own electrical power requirements.

D. Temporary Power Distribution:

1. The Electrical **Contractor** will provide and maintain temporary power distribution as follows:

Construction power shall be 120/208 volts, 3 phase, 4 wire plus ground. Provide the following outlets together with feeders, grounding, protective devices and ground fault interrupting devices.

- a. Power centers - on each floor of the new building, provide a minimum of two (2) power centers or not less than one (1) per 10,000 s.f. rated not less than 100 amperes at 120/208 volt, 3 phase, 4 wire plus ground. Locate the power centers such that each will serve approximately equal areas and as far as possible, each be in the center of the respective area served.
 - b. 120 volt duplex outlets - Provide weatherproof, G.F.I. protected, 20 ampere grounded outlets at a minimum rate equal to 1 - duplex outlet per 400 square feet. Outlets may be grouped in clusters of up to six duplex types with corresponding pro-rated increase in area served, provided that every portion of the construction and remodeled premises can be reached from the nearest outlet using a flexible cord no more than 50 feet in length.
2. As partitions are erected, locations of power distribution points shall be added or relocated.

3.09 TEMPORARY ELECTRICAL POWER AND LIGHT (Cont'd)

3. Ground Fault Circuit Interrupter (GFCI) protection will be provided on all temporary power receptacles and, where possible, directly on the circuit breaker supplying temporary power as referenced in NEC 305-6(a).
4. The assured equipment grounding conductor program is only to be used on circuits greater than 20 amps as referenced in NEC 305-6(b).

E. Temporary Electrical Light Distribution:

1. The **Electrical Contractor** shall provide and maintain temporary electrical light distribution as follows:
 - a. Lighting shall be achieved using 120 volt guarded incandescent fixtures, or other suitable fixture types, to OSHA required minimum levels of illumination.
 - b. 120 volt temporary lighting as required in interior work areas. In addition to these minimum requirements provide adequate security lighting at guarded entrances outside storage areas, parking areas, and in areas of **Contractor's** and Architect's field offices and sheds.
2. As partitions are erected or other interferences which hamper achieving the minimum levels of illumination, locations of lighting distribution points shall be added or relocated.
3. Task lighting in addition to OSHA required lighting shall be provided by each **Contractor**.

F. Temporary Power and Light for Special Conditions:

1. Special conditions for temporary electrical power and lighting required by others shall be provided as follows:
 - a. Each **Contractor** requiring service of capacity or characteristics other than specified must make arrangements with the Electrical **Contractor** and pay for their own installation, removal, and service.
 - b. Where 3 phase power is required, the **Contractor** must pick up service at the distribution panel located outside the building addition.
 - c. The necessary grounded portable cords, lamps, light-stands, and fuses from the distribution outlets to points of use shall be provided by each **Contractor** to suit its own requirements.

G. Servicing of Temporary Power and Lighting:

1. The Electrical **Contractor** shall be responsible for the following:
 - a. Servicing, repairing and rearrangement of service equipment, temporary power, temporary lighting, and re-lamping.
 - b. Removal and disposal of temporary electrical power and lighting at completion of the Project or when so directed by Barton Malow Company and repair of damage caused by installation or removal.

H. Permanent Electrical Power and Lighting:

1. When permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposes provided the Electrical **Contractor**:
 - a. Obtains the approval of the Architect and/or Owner through Barton Malow Company.

- b. Assumes full responsibility for operation of the entire power and lighting systems.
 - c. Verifies that warranty dates are established prior to usage of equipment and lamps.
 - d. Pays costs for operation, maintenance, and restoration of the systems.
2. As permanent power and lighting becomes available, these systems will generally supplant the appropriate portions of the temporary installation.

3.10 TEMPORARY HEATING AND WEATHER PROTECTION

A. Temporary heating requirements during the course of construction shall be divided into two categories as follows:

- 1. Cold weather protection.
- 2. Temporary heating.

B. Cold Weather Protection:

- 1. Heating required during the construction period prior to enclosure of the building shall be classified as "cold weather protection."
- 2. Each **Contractor** shall provide temporary heating and protection, necessary to allow its Work to continue during cold weather to meet the project milestone dates prior to building enclosure, including:
 - a. The heating of materials (such as water and aggregate) as well as space heating for protection of newly placed or built construction at required temperatures (but not lower than 50 degrees F) and for the time specified.
 - b. Flame-proofed tarpaulins and other materials used for temporary enclosures.
- 3. **Contractor** shall provide plan to allow Work to continue without regard to temperature.
- 4. Heat shall be provided by smokeless UL approved portable unit heaters, using fuel of types and kinds approved by Underwriter's Laboratories, Factory Mutual, and the Fire Marshal.
 - a. The **Contractor** shall provide fuel, power, maintenance, and attendance required for operation of portable heaters.
 - b. Interior or exterior surfaces damaged by the use of portable heating units shall be replaced with new materials at the responsible **Contractor's** expense.
- 5. It shall be the responsibility of each **Contractor** to protect its own Work.

C. Temporary Heating:

- 1. Daily construction heat required after the building is enclosed shall be classified as "temporary heating" and will be the responsibility of the Owner to install and maintain.
- 2. The building or buildings or any portions thereof shall be considered enclosed when in the opinion of Barton Malow Company:
 - a. The exterior wall system and temporary interior wall enclosures are in place.

- b. Openings in exterior walls are covered to provide reasonable heat retention.
- c. The building is ready for interior drywall, masonry and plastering operations.
- d. The permanent roof is substantially installed.

The **Barton Malow Company** shall provide and maintain the temporary interior wall enclosures. If the exterior wall system is not complete in time to provide building enclosure of a portion of the new structure as scheduled, the **Barton Malow Company** shall provide and maintain temporary exterior wall enclosures of polyethylene and, in addition to exercising all other rights and remedies under the Contract Documents and law, Barton Malow Company shall be entitled to deduct the cost of such enclosures from the moneys due or to become due the **Contractor(s)** responsible for failure to meet said schedule.

- 3. In areas of the building or buildings where Work is being conducted, the temperature shall be maintained as specified in the various sections of the specifications, but not less than 50 degrees F for interior rough-in and not less than 60 degrees F during finishes installation. The temperature shall not be allowed to reach a level that will cause damage to any portion of the Work, including materials stored in the building, which may be subject to damage by low temperatures.
- 4. Until the permanent heating system, or suitable portion thereof, is in operating condition, provide sufficient and UL approved space heaters of suitable capacity to maintain required temperatures in areas where work is being conducted and materials are stored. Include all necessary maintenance, venting and attendance for this temporary heating to meet all applicable laws, rules and regulations.
- 5. When the permanent heating system, or a suitable portion thereof, is in operating condition, the system may be used for temporary heating, provided the **MECHANICAL Contractor**:
 - a. Obtains approval from Barton Malow Company in writing for its use and any special provisions required for its temporary operation.
 - b. Assumes full responsibility for the entire heating system until final acceptance of the system by the Owner.
 - c. Uses supply only, not return if temporary heating utilizes the building's ductwork system.
 - d. Pays all costs for maintenance, attendance and restoration to "like new" condition of the system including final cleaning of equipment and ductwork and all necessary touch-up painting.
 - e. Turns over satisfactory evidence to Barton Malow Company showing the extended warranties from manufacturers and proper maintenance procedures.
 - f. Provides and maintains temporary filters, boxes and other parts used for the temporary condition and replaces same with the new permanent filters at time of occupancy consistent with the warranty provisions. The **MECHANICAL Contractor** shall pay the cost of extending warranty and guarantee periods on any permanent equipment used prior to substantial completion.
- 6. Electrical power required for temporary heating **will** be furnished free of charge. The installation and service of the necessary temporary electrical feeders will also be the responsibility of the **Electrical Contractor**.

3.11 TEMPORARY ENCLOSURES

- A. **Contractor** shall provide temporary (insulated) weather-tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

- B. **Contractor** shall provide temporary roofing as required to provide and maintain a watertight enclosure during construction.
- C. **Contractor** shall provide temporary partitions and ceilings as required to separate Work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas and to prevent damage to Owner's facilities and equipment.

END OF SECTION 01520

**SECTION 01530
FIELD ENGINEERING AND LAYOUT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 LAYOUT OF THE WORK

- A. **Each Contractor shall be responsible for the layout and engineering of its own Work from the established points and lines given by a registered surveyor employed by Barton Malow Company and to coordinate with all other trades.**
- B. Each **Contractor** is responsible for detailed and accurate layout of its own and its Subordinate Parties' Work to dimension from the principal lines, grades and levels set forth in the Contract Documents or the principal lines, grades and levels provided by a registered surveyor hired by **Barton Malow Company**. Each **Contractor** shall make provisions to preserve all control points, such as monuments, stakes, bench marks or other datum points and shall replace at its own cost any of these which might be lost or displaced through its neglect.
- C. **Contractors** shall examine the conditions under which the Work is to be installed, shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the **Contractor** with the Contract Documents before commencing activities. Any errors, inconsistencies, omissions, discrepancies or conditions detrimental to proper performance of the Work that are discovered shall be reported to Barton Malow Company at once. **Contractors** are not to proceed until the required corrections are accomplished.
- D. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by Architect or the work installed by other contractors, is not guaranteed by Owner or Barton Malow Company. The **Contractor** shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other Work, it shall verify at the site all dimensions relating to such existing or other Work. Any errors due to the **Contractor's** failure to verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the **Contractor** without any additional cost to the Owner or Barton Malow Company.
- E. As the Work progresses, the **Contractor** shall prepare lay out drawings showing the exact locations of Work under its Contract as a guide to all trades. Prior to any installation, the separate **Contractors** shall exchange layout drawings and coordinate the Work and be subject to verification by all subsequent **Contractors**.
- F. As Work under each Agreement commences, the condition of preceding Work under other agreements shall be verified and accepted by each subsequent **Contractor** when appropriate. Verification may, at Barton Malow Company's discretion, include a joint review by the subsequent **Contractor**, previous contractor(s), and Barton Malow Company to note any corrective Work required, damage to previous Work, verification of elevations, tolerances, levels and plumbness, critical dimensions, surface conditions, and similar items affecting the Work under the Contract Documents and particularly items which prevent acceptance by the subsequent contractors. The verification review procedures and findings shall be documented in writing by subsequent **Contractors**, signed by all parties, and copies provided to the Barton Malow Company. Any corrective work necessary to satisfy requirements of the Contract Documents shall be performed promptly by the previous **Contractor** to prevent delay to the work under the subsequent Contracts. After corrective work is accomplished the subsequent **Contractor** shall furnish written acceptance of the work as noted above. Barton Malow Company's participation in a joint review under this paragraph shall in no event be

deemed to constitute approval of any layout or other Work that fails to comply with the **Contract Documents**.

- G. Each **Contractor** shall be responsible to take such field measurements as may be required to determine the size of ordered material. In the event "guaranteed dimensions" are required, the **Contractor** shall promptly advise other **Contractors** through Barton Malow Company by use of drawings, templates or mock-ups of the required conditions.
- H. All Work, and in particular, piping, ducts, conduit and similar items, shall be neatly and carefully laid out to provide the most useful space utilization and the most orderly appearance. Except as otherwise indicated or directed piping and similar Work shall be installed **as close to above ceiling floor slabs and walls** as conditions reasonably permit, located to prevent interference with other Work or with the use of the spaces. Before **Contractor** installs a valve in an exposed location, it must make all efforts to install it in an accessible, concealed location. **Contractors** shall carefully plan the layout and review any questionable installations with Barton Malow Company.
- I. The Owner or Barton Malow Company may utilize a registered land surveyor to verify alignment and layout of certain portions of the Work. If that Work is out of tolerance or incorrect, the installing **Contractor** will be responsible for prompt correction of the Work to comply with the Contract Documents, along with all expenses incurred by Owner or Barton Malow Company in such verification process, including, but not limited to, the cost for the surveying services, as well as the additional time expended by Barton Malow Company personnel at standard billing rates.

END OF SECTION 01530

**SECTION 01540
CUTTING AND PATCHING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut, including elements subject to damage or movement during cutting and patching work. Report any unsatisfactory or questionable conditions to Barton Malow Company in writing.
- B. Before proceeding, meet at the site with Barton Malow Company and the parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference, conflict and possible effects on the Owner's existing operations. Coordinate procedures, temporary support, methods of dust and water protection, etc. and resolve potential conflicts before proceeding.
- C. When working in and around existing buildings, if any hazardous material is encountered or is suspected to be present, Barton Malow Company must be notified and Work in the affected area is to stop as described in Section 00840 Hazardous Materials until further direction is given by Barton Malow Company or the Owner.

1.03 PREPARATION

- A. Provide adequate temporary support as necessary to assure the structural value and integrity of the affected portion of the work. Where specified or required, submit temporary support methodologies to the Architect for approval.
- B. Provide devices and methods to protect adjacent areas or other portions of the Project from damage including dust protection, water protection, and exposure. Maintain excavations free of water, and all other devices and methods as necessary to provide protection from the elements.

1.04 EXECUTION

- A. **The use of gasoline powered equipment, jackhammers or power actuated tools, explosives is prohibited on this Project. The use of electric and pneumatic impact hammers must be first authorized and coordinated by the Barton Malow Company prior to usage.**
- B. Each **Contractor** on behalf of itself and its Subordinate Parties is responsible for the cutting of all holes and openings through existing walls, partitions, ceilings, floors and roofs as necessary for the installation of its Work as specified in the Contract Documents. Holes and openings shall be neatly cut and of minimum size to allow the Work to be installed. Execute cutting and demolition by methods which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs.
- C. Execute work in such a manner as to minimize disruptions to or interference with the Owner's normal operations or functioning in the existing buildings and provide all means necessary to provide safety and convenience of those employed in and about the premises.
- D. Each **Contractor** is responsible for patching of all holes and openings it makes. Fit work should be airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Patching is to match adjacent surfaces in materials and finish. Each **Contractor** is to utilize only tradesmen skilled in the specific finish

and material involved in making the patches. All patching is to be done in a neat and workmanlike manner to the satisfaction of Barton Malow Company. Defective Work shall be corrected at no cost to the Owner and Barton Malow Company.

- E. Where new Work connects with existing Work, **Contractor** shall do all necessary cutting and fitting required to make a satisfactory connection with the Work to be performed so as to leave the entire Work in finished and workmanlike condition. Furnish all labor and materials to this end, whether or not shown or specified. All measurements must be verified at the site.
- F. Employ the original installer and fabricator, when possible, to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- G. Execute fitting and adjustment of products to provide a finished installation to comply with the specified products, functions, tolerances and finishes.
- H. **Contractor** shall restore Work which has been cut or removed and shall install new products to provide completed Work in accordance with the Contract Documents. Each **Contractor** will be responsible to pay the appropriate **contractor** as designated by Barton Malow Company for restoring any portion of the Project that is disturbed, including but not limited to, slabs, walls, ceilings, fire rated partitions, spray-on fireproofing, and finishes, to their original state as a result of **Contractor's** action.
- I. Refinish entire surfaces as the **Contractor's** Work scope requires to provide an even finish to match adjacent surfaces and finishes.
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish the entire unit.
- J. Removal and replacement of ceilings not scheduled to be replaced shall be the responsibility of the **Contractor** requiring access.
- K. **Contractor** shall be held responsible for reckless cutting of holes in slabs, walls or other finishes, or for scraping off areas of fireproofing larger or greater than that which is necessary for installation of its Work.

END OF SECTION 01540

**SECTION 01550
CLEAN-UP AND FINAL CLEANING**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. Execute final cleaning at completion of the Work, as required by this Section. For **Contractor's** daily clean-up, dust control and rubbish removal operations during construction, refer to Section 01520 Temporary Construction Controls.

1.03 DISPOSAL REQUIREMENTS

- A. Conduct final cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
1. Do not burn or bury rubbish and waste materials on Project site.
 2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

PART 2 - BARTON MALOW SITE CLEAN-UP/RUBBISH REMOVAL PROCEDURE**2.01 PURPOSE**

- A. An effective and efficient clean-up procedure on the Project site contributes to both the productivity and safety of all those involved. The following requirements are intended to provide a satisfactory and equitable method to manage and accomplish project clean up.

2.02 REQUIREMENTS

- A. General: Each **Contractor** shall be responsible for daily, weekly and final clean-up of its Work and the work of its Subordinate Parties as defined herein. The cost of this requirement shall be included in the **Contractor's** Bid Proposal. **Contractor** is required to comply with applicable labor agreements and jurisdictional rules in the hiring of laborers to perform its clean up obligations under the Contract Documents. Each **Contractor** will be responsible for control of dust generated by its operations on a daily basis. Roadways must be maintained clear of all debris at all times. **Contractors** shall only use cleaning materials which will not create hazards to health or property and which will not damage surfaces. Only those cleaning materials and methods recommended by the manufacturer of the surface material to be cleaned shall be used. Any sweeping compounds used in cleaning operations shall not leave residue on concrete floor surfaces that may affect installation of finish flooring materials.
- B. Dumpsters: The **Owner** will provide and maintain the job site dumpsters for unidentifiable debris for use as specified below. Each **Contractor** and its Subordinate Parties shall be responsible for daily clean-up, removal and placement in dumpsters of all debris and waste resulting from its operations. No overfilling of dumpsters will be allowed. All adjacent areas are to be kept clean. Excavation, demolition, masonry, drywall and hazardous waste materials are NOT to be placed in Barton Malow Company's dumpster. Each **Contractor** will be responsible for removing its own excavation, demolition, masonry, drywall and Hazardous Materials from the site in strict accordance with applicable laws and regulations regarding disposal. **Contractor** shall indemnify, defend and hold harmless the Owner and Barton Malow Company from claims, damages, suits, costs, or expenses of

any kind (including attorney's fees and costs) arising out of, resulting from or in connection with **Contractor's** misuse of dumpsters furnished by **Owner**.

- C. **Daily Clean Up:** Each **Contractor** shall be responsible, **DAILY** for the clean-up, transport and removal from the site of identifiable debris including but not limited to, bulky debris, packaging, containers, unused materials and equipment, (i.e. masonry and concrete materials, drywall, steel, crates, carton, demolition debris, other packaging, and combustible items). No piles of debris shall be left in the building overnight. The cost of any overtime premium required to remove debris immediately at the end of each workday shall be included in the **Contractor's** Base Bid.

Each **Contractor** must handle materials in a controlled manner during clean-up and all other operations so that dust and other contaminants resulting from the cleaning or disposal process will not affect the Owner's operations or equipment or the work or equipment of any other **Contractor** on the site. Each **Contractor** is responsible to leave its Work and work area in a clean condition. This includes, but is not limited to, removal of all grease, dust, dirt, stains, labels, fingerprints and other foreign matter.

- D. **Weekly Clean Up:** Each **Contractor**, while on site, shall provide to Barton Malow Company one (1) person for each five tradesmen (or portion thereof) employed at the site, one day per week, for up to four (4) hours, for the exclusive purpose of performing overall project weekly clean-up of unidentifiable debris. The cost of this (these) person(s) shall be included in **Contractor's** bid. The weekly clean-up Work shall include sweeping, loading and disposal of miscellaneous debris such as mud tracked through the building, drinking cups, bottles, lunch wrappers and other unidentifiable debris. Trash and debris from this operation shall be placed in the dumpster(s) provided by the Owner. Barton Malow Company will furnish sweeping compound to hold down dust during the weekly clean up.
- E. **Final Clean Up:** Final clean-up, will be done at a time designated by Barton Malow Company. Normally, Final Clean Up will occur before punchlist inspection or prior Owner Occupancy turnover. The [Contractor/Subcontractor(s)] duties for Final Cleaning are set forth in Part 3.01 below.
- F. **Use of Owner's Facilities:** The Owner's facilities are not to be used by **Contractor** for the disposal of trash or debris from its Work.
- G. **Failure to perform Clean Up:** If any **Contractor** or its Subordinate Parties fails to maintain a satisfactory clean-up program, Barton Malow Company will issue written notice, to the responsible **Contractor**, that the necessary clean-up must be performed within twenty-four (24) hours after the notice is given. The establishment of a definite deadline for the removal of debris and rubbish will supersede the necessity for any formal notification that such work must be done. If **Contractor(s)** fail to perform the clean-up, by the deadline, Barton Malow Company may perform clean-up on the Project and back charge the responsible **Contractor(s)** for the costs. If necessary in order to remove unidentifiable debris beyond what is removed during weekly clean up, Barton Malow Company will perform such clean-up and shall pro-rate the cost among the **Contractors** in its discretion, based on **Contractor(s)** type of work and manpower on site. The minimum amount for any back charge by Barton Malow, if implemented, will be **\$500.00**. Back charges may be deducted from the monthly invoices of the [Contractor/Subcontractor(s)] and/or final payment.
- H. **Hazardous Materials:** **Contractors** or Subordinate Parties must dispose of Hazardous Materials in strict accordance with applicable federal, state, and local laws and regulations. Hazardous Materials may not be placed in dumpsters and/or containers not so designated for such placement.

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. The **CONTRACTOR** will employ an adequate number of personnel for final cleaning. Final Cleaning consists of the following Work:
- 1) Removal of grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and all other foreign materials from sight-exposed interior and exterior surfaces.
 - 2) Vacuuming all carpets and spot cleaning any stains. Cleaning and waxing VCT floors.
 - 3) Washing and shining glazing and mirrors.
 - 4) Polishing glossy surfaces to a clear shine.
 - 5) Dusting cabinet work and removing foreign markings.
 - 6) Broom cleaning exterior paved surfaces and raking clean other surfaces of the grounds.
- B. In addition to the tasks set forth above, each **Contractor** shall be responsible for the following for its Work.
- 1) Prior to final completion or Owner occupancy, whichever occurs first, **Contractor** shall conduct an inspection of sight-exposed interior and exterior surfaces, and all Work areas, to verify that the entire Work is left in a broom clean condition and that all Final Cleaning as set forth above has been performed.
 - 2) Tunnels and closed off spaces shall be cleaned of packing boxes, wood frame members and other waste materials used in the construction.
 - 3) The entire system of piping and equipment shall be cleaned internally. **Contractors** installing piping or equipment shall open all direct pockets and strainers, completely blowing down as required by the technical specifications and the manufacturers' instructions, and shall clean strainer screens of all accumulated debris.
 - 4) Tanks, fixtures and pumps shall be drained and proved free of sludge and accumulated matter.
 - 5) Temporary labels, stickers and similar items shall be removed from fixtures and equipment. Unless otherwise directed in the technical specifications, **Contractors** shall not remove permanent name plates, equipment model numbers, ratings, or other items intended to be permanently affixed to the fixture or equipment.
 - 6) Heating and air conditioning equipment, tanks, pumps and traps shall be thoroughly cleaned and new filters or filter media installed.
 - 7) Before being placed in service, domestic water distribution systems, including those for cold water, drinking water and the hot water system shall be chlorinated. Review Technical Specifications for Products and Procedures.

END OF SECTION 01550

**SECTION 01600
FORMS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Specific attention is directed to all Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section and relate to various forms referenced for the project.

1.02 USE OF FORMS

- A. Upon award of the Agreement, the various forms described and referenced in the Project Manual will be provided by Barton Malow Company and therefore are bound in the Project Manual.
1. Copies of forms are available for inspection at Barton Malow Company, 1301 Boyd, Troy, MI 48083.

00620 Insurance

- Certificate of Insurance (ACORD) Form

00810 Safety and Loss Control Program

- Trade Contractor Safety Certificate (CON.7.9)

01290 Payment Procedures

- Application and Certificate for Payment (CON.27.1) and Continuation Sheet
CON.27.2 – NOT Included
- Consent of Surety to Reduction In or Partial Release of Retainage (CON.26.6) – **NOT Included**
- Payment schedule (PSI.10.1)
- Payment Request for Stored Materials Form (CON.26.5)
- Acknowledgment of Payment and Partial Unconditional Release Form (CON.26.3)
- Unconditional Final Release and Waiver Subcontractor/Materialman Form (CON.26.4)
- Sworn Statement Form (CON.26.2)

01250 Changes in the Work

- PCO- Notice to Proceed – **Draft Included**
- PCO- Quotation Only – **Draft Included**
- Change Order Form (CMS.9.1 or CMS.9.2)

01320 Communications

- Trade Contractor's Daily Report Form (CON.14.4)
- Request For Information Form (CON.25.2)

01330 Submittals

- BMC Submittal Transmittal Form (CON.9.6)

01400 Quality Requirements

- **Corrective Action Report (CAR)/Notice of Non-Conformance (NCR) (CON.18.2)**

01700 Contract Close-out

- Consent of Surety Company to Final Payment Form (CON.26. 7) – **NOT Included**
- Consent of Surety to Reduction in or Partial Release of Retainage Form (CON.26.6) – **NOT Included**
- **Certificate of Contract Completion Form (CLO.7.5)**

- 01720 Project Record Documents**
 - **Closeout Submittal (CLO.7.2)**

- 01740 Warranties and Guarantees**
 - **Contractor's Guarantee (CLO.7.3)**

- 01750 Systems Demonstration, Training and Start-up**
 - **Equipment/Systems Acceptance Form (CLO.2.1)**
 - **Owner Training Register (CLO.2.2)**

END OF SECTION 01600

TRADE CONTRACTOR SAFETY CERTIFICATE

Contractor Name _____

Project Name Athens High School Concessions' Remodeling

Project Number 041049 - BP #9393

Nature of work (e.g., masonry, drywall) _____

- 1. Does Contractor have a written safety plan applicable to this Project?
 Yes (attach copy); or Will be provided before on-site work begins.

- 2. Contractor agrees to follow on this Project (for itself and its subs at any tier):
 - a. All applicable legal standards for safety, including OSHA regulations;
 - b. Any Site Specific Safety Rules furnished for this Project;
 - c. 100% fall protection at elevations over six feet;
 - d. NCCCO certification for all crane operators;
 - e. Job Hazard Analysis to plan for safety before each work task begins;
 - f. Prompt reporting of all OSHA recordable and lost time injuries, plus monthly reports of work hours and incident rates;
 - g. Commitment of adequate management and financial resources to assure safety compliance and enforcement. Yes (no other alternative).

- 3. Contractor expects to encounter the following potential hazards on this Project, and its written safety plan contains appropriate provisions to address them:

	Potential Hazard	Yes	No	Name the Competent Person*
1	Work from heights (ladders, edges, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	
2	Scaffold erection or use	<input type="checkbox"/>	<input type="checkbox"/>	
3	Aerial work platforms	<input type="checkbox"/>	<input type="checkbox"/>	
4	Energized equipment (electrical, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	
5	Respirator use	<input type="checkbox"/>	<input type="checkbox"/>	
6	Confined space work	<input type="checkbox"/>	<input type="checkbox"/>	
7	Trenching/excavation	<input type="checkbox"/>	<input type="checkbox"/>	
8	Cranes, fork trucks, or heavy equipment	<input type="checkbox"/>	<input type="checkbox"/>	
9	Environmental hazards	<input type="checkbox"/>	<input type="checkbox"/>	
10	Fire or explosion hazards	<input type="checkbox"/>	<input type="checkbox"/>	
11	Aircraft or watercraft use	<input type="checkbox"/>	<input type="checkbox"/>	
12	Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	

* Where applicable, properly qualified and trained individual who will assure compliance with pertinent standards, procedures, and/or training requirements.

4. Contractor has established procedures for handling first aid and other occupational injuries including medical and fire emergencies.

Name of person certified in first aid and CPR: _____

I certify that the above information is correct, and I accept responsibility for implementing and enforcing the safety plan on this Project.

Contractor's Representative

Phone Number

Date

CONSTRUCTION PAYMENT SCHEDULE⁽¹⁾ For work in place through the 20th of the month⁽²⁾ If required documentation is complete and performance is justified for release

YEAR/ MONTH	TRADE CONTRACTOR ROUGH DRAFT ⁽¹⁾ PAYMENT APPLICATION (Due Date)	TRADE CONTRACTOR FORMAL PAYMENT ⁽¹⁾ APPLICATION DUE DATE (To BMC - 1301 Boyd Rd Troy, MI)	DISTRIBUTE CHECKS ⁽²⁾ TO TRADE CONTRACTORS
2007			
January	19	25	TBD
February	20	23	TBD
March	20	23	TBD
April	20	25	TBD
May	18	25	TBD
June	20	25	TBD
July	20	25	TBD
August	20	24	TBD
September	20	25	TBD
October	19	25	TBD
November	20	26	TBD
December	20	26	TBD
2008			
January	18	25	TBD
February	20	25	TBD
March	20	25	TBD
April	18	25	TBD
May	20	23	TBD
June	20	25	TBD
July	18	25	TBD
August	20	25	TBD
September	19	25	TBD
October	20	24	TBD
November	20	25	TBD
December	19	26	TBD

PAYMENT REQUEST FOR STORED MATERIAL

To: _____

Project: Athens High School
Concessions' Remodeling

BID PACK #9393

From _____
 (Name of Contractor)

Contract No. _____
 Payment Application No. _____
 Period: From _____ To: _____

In accordance with the provisions of the payment to contractor section of the contract general conditions, request is made for payment as "stored materials" for the following materials.

ITEM NO.	QTY.	MATERIAL DESCRIPTION	VALUE	TYPE OF SUBSTANTIATING EVIDENCE OF PURCHASE ATTACHED	WHERE STORED (*)

AFFIDAVIT:

The materials listed above have been purchased exclusively for use on the above referenced project. The material is separated from other like materials and is physically identified as our property for use only on contract no _____
 The owner or owner authorized representative may enter upon the premises for the purpose of inspection, checking or auditing, or for any other purpose as it considers necessary. It is expressly understood and agreed that this information and affidavit is furnished to the owner for the purpose of obtaining payment of the above materials before they are delivered to, or incorporated into the project described above. A revised form showing the current status of the value of materials for which payment is being requested will be submitted each estimate period.

_____ signed _____ date _____

name of contractor _____

State of _____ county of _____

Subscribed and sworn to before me this _____ day of _____ 20

_____ (Notary Public) _____ (Commission Expires)

* when stored at a location other than on the jobsite or at a fabricator's yard, bonded warehouse receipt for the material and a certificate of insurance showing coverage of materials stored issued in the name of the owner, shall accompany the request for payment. In case the storage location (other than the jobsite or fabricator's yard) is the contractor's property, the area containing the material within the fence area is the property of the owner. The responsibility for protecting the materials remains that of the contractor.

Instruction to contractor

Submit this form with each required copy of aia document g702. Attach evidence of purchase (and warehousing receipts when required), along with proof of insurance of bonded warehouse to original.

**ACKNOWLEDGEMENT OF PAYMENT
AND PARTIAL UNCONDITIONAL RELEASE**

FOR WORK INVOICED THROUGH: _____ **JOB NO.:** 041049 - BP #9393
DATE: _____

In consideration of the payment of the below referred to check and other good and valuable consideration, the receipt of which is hereby acknowledged, the undersigned subcontractor warrants that all labor, material or equipment and any associated taxes, wages or fringe benefits furnished by subcontractor in and for the erection, construction ornamentation or improvement of a building and/or structure described as: _____ as situated at _____ has been fully paid for by subcontractor and that there are no amounts unpaid in favor of its subcontractors or material suppliers or any other persons furnishing labor, equipment or material to subcontractor and utilized in the performance of the contract(s) of the above described project. Subcontractor does hereby acknowledge that payment to the undersigned has been received for all such supervision, services, supplies, labor and/or materials directly and indirectly supplied for such improvement by the undersigned to the extent of that amount stated below and relinquishes and waives its rights to all construction or mechanic's liens, claims of liens, or liens or claims of any nature and all labor and material bond rights, and forever release and discharge Barton Malow Company, its successors and assignees to the extent of this amount and regarding activities on the noted contract to this date. This certificate is required in your contract(s).

Contract No.: _____ with _____

Amount of this Payment: _____

Check Number _____

Accumulated Payment to Date: _____

Company: _____

:
By: _____

Title _____

Date _____ Phone No. _____

Witnessed By: _____

UNCONDITIONAL FINAL RELEASE AND WAIVER TRADE CONTRACTOR/SUBCONTRACTOR/MATERIALS SUPPLIER

VENDOR NO. _____

CONTRACT/SUBCONTRACT/ORDER NO. _____

JOB NO. 041049-BP #9393

TOTAL CONTRACT AMOUNT _____

AMOUNT OF FINAL CHECK _____

The Contractor/Subcontractor/Material Supplier, _____, on behalf of itself, its successors and assigns (collectively, the "Contractor"), in consideration of payment in full of the Contract Amount listed above and other valuable consideration, receipt of which is hereby acknowledged, hereby waives, releases and forever discharges Owner, Barton Malow Company, and Barton Malow Company's surety providing a payment bond for the Project (if applicable), and their respective officers, agents, employees, representatives, affiliates, successors and assigns (the "Released Parties"), from any and all claims, actions, causes of action, debts, liens, stop notice or bond rights, demands, suits, liabilities, judgments, damages, or expenses, whether known or unknown, which the Contractor now has or may have in the future, arising out of or in connection with work performed and/or materials, supplies or equipment furnished for the improvement of the Project.

Project Name _____
Project Address _____

under its Contract/Subcontract/Order with either Owner or Barton Malow Company dated _____, including any additional work or labor performed and/or materials, supplies or equipment provided at the written or oral request of, or with the express or implied consent of Owner and/or Barton Malow Company, except for the disputed claims that are noted on the reverse side of this waiver, in the aggregate amount of \$_____.

The Contractor, on behalf of itself, its successors and assigns, further agrees to defend, indemnify and hold harmless the Released Parties, from and against any and all claims, actions, causes of action, debts, liens, stop notice or bond rights, demands, suits, liabilities, judgments, damages or expenses ("Claims"), including all attorneys fees and costs, whether arising out of injury or damage to person or property in connection with the work performed on the Project, or whether arising from claims by the Contractor's subcontractors, material suppliers, laborers, or their unions or union benefit plans for non-payment of materials, services, labor, or equipment, except for Claims caused by the sole negligence of a Released Party.

The Contractor certifies the following: (1) there has been no assignment or other transfer of its interest arising from the Contract/Subcontract; (2) the work performed by the Contractor has been completed in full accordance with the terms and conditions set forth in the Contract/Subcontract/Order; and (3) all the Contractor's subcontractors, laborers and material suppliers, have been paid in full for their work under the Contract/Subcontract/Order, including, but not limited to taxes, wages and fringe benefits for which previous payments were received by the Contractor.

The obligations of the Contractor under this Unconditional Final Release and Waiver are in addition to, and not in lieu of, the Contractor's continuing obligations under the Contract/Subcontract/Order and nothing in this Unconditional Final Release and Waiver shall be construed to modify such obligations.

The person executing this Unconditional Final Release and Waiver on behalf of the Contractor represents and warrants that he/she is duly authorized and empowered to sign and execute this Unconditional Final Release and Waiver on his/her own behalf and on behalf of the Contractor.

Signed this _____ day of _____ 20____ Company _____
State of _____ by: _____
(signature)

County of _____ its _____
(corporate or company officer)

On this _____ day of _____ 20____ before me came _____,
to me known, who being by me duly sworn did depose and say that he/she resides in _____
and that he/she is the _____ of the corporation described herein and which executed the above instrument.

(notary public)

(notary seal)

(expiration date)

*strike through titles not applicable

SWORN STATEMENT

STATE OF: _____)
)ss.
COUNTY: _____)

Being duly sworn, deposes and says or affirms that _____ county,
is the (contractor) (subcontractor) for an improvement to the following described real property situated in _____

described as follows (insert legal description)

Contract # _____

That the following is a statement of each subcontractor and supplier and laborer (for which laborer the payment of wages and/or fringe benefits and withholdings may be due), with whom the (contractor) (subcontractor) has (contracted) (subcontracted) for performance under a contract for the benefit of an owner or lessee, and that the amounts due to the persons as of the date hereof are correctly and fully set forth opposite their names as follows:

* (Some columns are not applicable to all persons listed)

Name of Subcontractor supplier, or laborer (list items over \$1000 only)	MC*	Type of improvement or material furnished	Total Contract Price	Amount previously paid	Amount currently owing	Balance to complete	Amount of laborer wages due but unpaid	Amount of laborer fringe benefits and withholdings due but unpaid
All items that are not specifically listed are under \$1000 and have been paid in full.								
TOTAL			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Contractor states that all supplies used, except those specifically provided for this project and listed above, have been taken from inventory and payments to these suppliers are current.

Contractor further states that the following are paid in full to date union contributions all obligations

- *MC= Minority 1) Enter one of the following codes: 1=African American 2=Hispanic 3=Asian American 4= Native American 5=WBE
- Code: 2) Also enter one of the following to describe how company determined its MBE/WBE status: A=Self-declared B=Certified by one of the affiliates of NMSDC C= Certified by public entity.
- 3) Example: 1A means company is a self-declared African American entity

DRAFT

CCD Number: 869
Date: 2/9/2007
Job No: 041049
Troy Schools 2004 Bond
Program

Attn:

Description:

Athens Concessions' - Description of work here.

Athens Concessions' - Description of work here.

This Construction Change Directive is issued as a Notice to Proceed on the following basis:

Schedule Impact: None

Reference Drawings:

Reference Specifications:

Reason For Change:

Reference Documents:

PCO 869-001

Change Instructions:

General description of work here.

DRAFT

Barton Malow Company

Issued By _____

Date _____

Received By _____

Date _____

CCD Number: 869
Date: 2/9/2007
Job No: 041049
Troy Schools 2004 Bond
Program

DRAFT

Attn:

Description:

Athens Concessions' - Description of work here.

Athens Concessions' - Description of work here.

**This Construction Change Directive is issued for Quotation Only
DO NOT PROCEED WITH CHANGE UNTIL DIRECTED BY BARTON MALOW COMPANY**

Quote Due: 2/16/2007

Schedule Impact: None

Reference Drawings:

Reference Specifications:

Reason For Change:

Reference Documents:

PCO 869-001

Change Instructions:

General description of work here.

DRAFT

Barton Malow Company

Issued By _____

Date _____

Received By _____

Date _____

Barton Malow Company

Change Order

PROJECT
(Name and address)

TO CONTRACTOR:
(Name and address)

CHANGE ORDER NUMBER:
DATE:
ARCHITECT'S PROJECT NUMBER:
CONTRACT DATE:
CONTRACT FOR:

OWNER
ARCHITECT
CONTRACTOR
FIELD
OTHER

THE CONTRACT IS CHANGED AS FOLLOWS:

(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

The original (Contract Sum) (Guaranteed Maximum Price) was \$ _____
The net change by previously authorized Change Orders \$ _____
The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was \$ _____
The (Contract Sum) (Guaranteed Maximum Price) will be (increased/decreased) (unchanged) by this Change Order in the amount of \$ _____
The new (Contract Sum) (Guaranteed Maximum Price) including this Change Order will be \$ _____
The Contract Time will be (increased) (decreased) (unchanged) by _____ days
The date of Substantial Completion as of the date of this Change Order therefore is _____

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which has been authorized by Construction Change Directives for which the cost or time are in dispute as described in Subparagraph 7.3.8 of AIA Document A201.

Not valid until signed by the Architect, Contractor and Owner.

ARCHITECT (Typed Name)

(Signature)

BY

DATE

CONTRACTOR (Typed Name)

(Signature)

BY

DATE

OWNER (Typed Name)

(Signature)

BY

DATE

Sample Generated by Company Approved Software

TRADE CONTRACTOR DAILY REPORT

DATE _____ PROJECT NUMBER: 041049-BP#9393

PROJECT NAME/SITE: Athens HS Concessions' Remodeling

ROUTING To: Barton Malow Superintendent _____
 From: Contractor Name/Field Rep _____
 Scope Description _____

<p>WEATHER CONDITIONS <i>External (Check appropriate box)</i> Sunny <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Windy <input type="checkbox"/> Snow <input type="checkbox"/> <i>Ground (Check appropriate box)</i> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Muddy <input type="checkbox"/> Frozen <input type="checkbox"/> Temperature Range Hig ° Low °</p>	<p>SAFETY ISSUES Accidents / Incidents <i>If yes, explain</i> No Yes <input type="checkbox"/> Personnel <input type="checkbox"/> <input type="checkbox"/> Equipment <input type="checkbox"/> <input type="checkbox"/> Property <input type="checkbox"/></p>	
---	---	--

CHECK ONE THAT APPLIES:

No Exceptions Noted Today Non-Conformance Report Written

VISITORS ON SITE	MAJOR MATERIAL RECEIVED

CLEAN-UP	EQUIPMENT ARRIVAL / DEPARTURE
Have you accumulated and properly disposed of the spoils from today's work activities? <input type="checkbox"/> Yes <input type="checkbox"/> No	

DESCRIPTION OF DAILY CONTRACTOR ACTIVITIES	WORKFORCE	
	TRADE	TOTAL
New Work Started	Clerical/Office	
	Supervision/Mgt	
	Carpenters	
Work Activities In Progress	Communications/Data	
	Concrete Finishers	
	Electricians	
	Elevator	
Work Completed	Flooring, Res/Carpet	
	Glaziers	
	Insulators	
Information Requested	Iron Workers	
	Laborers	
	Masons/Stone	
Is your work on schedule? <input type="checkbox"/> Yes <input type="checkbox"/> No	Millwrights/Riggers	
	Operators	
	Painters	
Impacts to Work In Progress	Pipefitters	
	Plasterers	
	Plumbers	
Additional Work	Re-Steel	
	Roofing/Waterproofing	
	Sheet Metal	
Coordination Issues	Sprinkler Fitters	
	Surveyors	
	Terrazzo/Tile Setters	
Quality Issues	Truck Drivers	
	Others:	
Information included on this form shall not constitute the required notification of delay, disruption, or claim.		
And requests for additional costs and/or time shall be submitted in accordance with the terms of the contract.	TOTAL	

Date: _____	RFI #: _____
To: _____	Contractor's Reference #: _____
_____	Project <u>Athens HS Concessions' Remodeling</u>
_____	_____
VIA <u>Barton Malow Company</u>	BMC Project #: <u>041049</u>
_____	A/E Project #: <u>2643-20</u>
_____	Bid Package #: <u>9393</u>
_____	Bid Category #: _____
From: _____	Return to: _____

Reference Specs: _____ Reference Drawings: _____ Rev. _____

Request: _____

Contractor or Subcontractor	Submitted By	Date
_____	_____	_____
Barton Malow Company	Reviewed By	Date
_____	_____	_____

Reply: _____ Attachments: _____

This clarification is interpreted to be within the scope of referenced contracts issued in accordance with the Contract Documents, and without change in Contract Sum or Contract Time, and, as such, is not an authorization for work beyond the scope of the contract.

Architect/Engineer	Reply By	Date
_____	_____	_____
RFI Response Posted on Drawings	_____	_____
Contractors Copied	_____	_____

SUBMITTAL TRANSMITTAL FORM

To be filled out by CONTRACTOR

Date: _____ Project Name: Athens HS Concessions'

Contractor _____ Contract for: _____

By: _____ Phone: _____

Check Type of Submittal: Spec. Section _____

Transparency

Non-Transparency Reproducible

Other

Contractor Submittal No.

(To be filled in by Barton Malow)

<u>Copies/Type</u>	<u>Sheet Number</u>	<u>Submittal Description (include manufacturer)</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

To be filled out by BARTON MALOW

Date: _____ Remarks: _____

To: _____

Attn: _____

From: _____

Copy to Owner

To be filled out by ARCHITECT/ENGINEER

Date: _____ Remarks: _____

To: _____

Attn: _____

From: _____

Approved Approved as Noted

Not Approved/Resubmit Reviewed

CORRECTIVE ACTION REPORT (CAR)

Project: _____	Date: _____
Company/Location: _____	CAR No. _____
Initiated By: _____	Tag No./Hold Area: _____ (as applicable)
Previous CAR # / Date: _____	
CAR Designation: <input type="checkbox"/> Audit Deficiency Report <input type="checkbox"/> Site Level-NCR <input type="checkbox"/> Customer Satisfaction <input type="checkbox"/> Corporate Procurement <input type="checkbox"/> Tech / FF&E - NCR	
FINDING/NONCONFORMITY: _____	Deficiency Classification: <input type="checkbox"/> Major <input type="checkbox"/> Minor <input type="checkbox"/> OFI
Location: _____	
Requirement (Standard or Specification): _____	
Finding / Nonconformity: _____	
Date: _____	
Recommended Disposition: <input type="checkbox"/> Use-As -Is <input type="checkbox"/> Rework <input type="checkbox"/> Reject <input type="checkbox"/> N/A	
Statement of Disposition: _____	
Expected Completion Date: _____	
Disposition Submitted By: _____	Date: _____
Disposition Reviewed/Approved By: _____	Date: _____
Owner/Customer Representative: _____	Date: _____
(NOTE: If contractually required, Owner/Customer concurrence required for USE-AS-IS or Rework Disposition)	
ROOT CAUSE / CORRECTIVE ACTION: _____	
Company Representative: _____	
Expected Completion Date: _____	
Date: _____	
REVIEW OF CORRECTIVE ACTION: <input type="checkbox"/> Accepted <input type="checkbox"/> Accepted/Need Verification <input type="checkbox"/> Rejected	
Reason for Rejection _____	
BMC Representative: _____	
Date: _____	
Owner/Customer Representative: _____	
Date: _____	
(as required)	

Distribution: Lead Auditor – Process Improvement Department (excludes Site Level – NCR)

CERTIFICATE OF CONTRACT COMPLETION

Project: Athens High School Concessions' Remodeling - BP#9393

Contractor:

Contract for:

Contract Date: Contract Amount: \$

Construction Manager's Affidavit

I solemnly swear and affirm: That the work under the above named contract and all amendments thereto has been completed in accordance with the requirements of said contract; that all costs incurred for equipment, materials, labor, welfare and fringe benefits, insurance, and services against the project have been paid; that no liens have been attached against the project; that no suits are pending by reason of work on the project under the contract; that all Workmen's Compensation claims are covered by Workmen's Compensation insurance as required by law; that all public liability claims are adequately covered by insurance, and that the Contractor shall save, protect, defend, indemnify, and hold the Owner harmless from and against any and all claims which arise as a direct or indirect result of any transaction, event or occurrence related to performance of the work contemplated under said contract.

Construction Manager: _____

Title:

State of:

County of:

Personally appeared before me this _____ day of _____ 20

known (or made known) to me to be the

(Owner)

(Partner)

(Corporate Officer Title)

of

Contractor(s) who, being by me duly sworn, subscribed to the foregoing affidavit in my presence.

Notary Public:

Commission expires:

CLOSEOUT SUBMITTAL

Project Athens High School Contractor: _____

Concessions' Remodeling Contract #: _____

Location: _____ Bid Package #: 9393

Description _____

The above named contractor is submitting the following for Barton Malow, Architect and Owner approval and use. *Check all appropriate:*

- As-Built Drawings
- Operation and Maintenance Manuals
- Maintenance Stock/Spare Parts
- Keys
- Contract Guarantee
- Special Guarantee/Warranty
- Other (Specify) _____

Reference:

Specifications _____ Section: _____ Page _____

Description: _____

Contractor: _____

Submitted by: _____

Barton Malow:

Received/Reviewed By: _____ Date: _____

Architect: _____ (Specify Name)

Received/Reviewed By: _____ Date: _____

Owner: _____

Received/Reviewed By: _____ Date: _____

CONTRACTOR'S GUARANTEE

STATE OF _____) Project: Athens HS Concessions' Remodeling - BP#9393
) SS Project No.: 041049
 County of _____) Owner: Troy School District

TO ALL WHOM IT MAY CONCERN:

_____ of the City of _____ County of _____
 and State of _____ being duly sworn,

deposes and says that s/he is _____ of _____ (the "Contractor") and, being duly authorized, makes this statement and guarantee on its behalf; that the Contractor, in completing the performance of a certain (check one) Subcontract Order # _____ with Barton Malow Company or Contract with Owner (the "Contract") for the Project, warrants that all of its Work under the Contract is of good quality and new, unless otherwise required or permitted by the Contract, and that the Work is free of defects and that the Work complies with the requirements of the Contract, including all documents incorporated into the Contract by reference. If within **2 TWO** year[s] after the date of Substantial Completion of the Project or designated portion of the Project, any of Contractor's Work is found to be defective or not otherwise in accordance with the requirements of the Contract, Contractor shall correct the Work at its sole expense promptly after receipt of written notice from the Owner or Barton Malow Company, including any other Work affected in correcting such defective or nonconforming Work (the "Correction Period"). The Correction Period shall be extended with respect to portions of the Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of Contractor's Work, and for an additional Correction Period following any correction. This obligation shall survive acceptance of the Work and termination of the Contract.

This Guarantee shall be in addition to the terms of any other warranty or longer period of obligation specified in the Contract, including all documents incorporated therein, or the terms of any general warranty, and is not in lieu of any of them. This Guarantee shall not be construed to establish a period of limitation with respect to other obligations, which the Contractor might have under the Contract and has no relationship to the time within which the obligation to comply with the Contract may be sought to be enforced or to the time, which any proceeding may be commenced.

<u>Trade or Work</u>	<u>Guarantee Period Commencement Date</u>
_____	_____
_____	_____
_____	_____

By: _____ Subcontractor
 _____ Title

Subscribed and sworn to before me this _____ day of _____ A.D. 20__

 Notary Public

in and for _____ County _____

My commission expires: _____

EQUIPMENT/SYSTEMS ACCEPTANCE

Athens High School Concessions' Remodeling - BP#9393

(Name of Project and Location)

CONTRACTOR: _____ **CONTRACT #:** _____

BID PACKAGE #: 9393 **DESCRIPTION:** _____

REPORT DATE: _____

Equipment/System Designation _____ **Model #** _____

Serial # _____ **Near Column Lines** _____ **and** _____

Location: _____ **Level:** _____

Operation Observed By: _____

Test/Inspection Observed By: _____

Date of Inspection: _____ **Time** _____ **AM** **PM**

The above equipment is being turned over to the Owner for start of guarantee period, commencing (___/___/___). Maintenance and operation after this date are subject to the following conditions:

Incomplete Work List Attached: _____

Accepted: **Owner's Name:** _____
By: _____
(Signature)

Acknowledged: **Architect's Name** _____
By: _____
(Signature)

Acknowledged: Barton Malow Company
By: _____
(Signature)

Date: _____

Distribution:

OWNER TRAINING REGISTER

Athens High School Concessions' Remodeling - BP#9393

(Name of Project and Location)

DATE OF TRAINING: _____

CONTRACTOR: _____ **CONTRACT #:** _____

EQUIPMENT/SYSTEM DESCRIPTION: _____

Reference:

Specifications: _____ Section: _____ Page: _____

Manufacturer(s): _____

Location: _____

PARTICIPANTS

Barton Malow: _____

Architect: _____

Contractor/Manufacturer: _____

Owner: _____

TRAINING COMPLETED IN ACCORDANCE WITH CONTRACT REQUIREMENTS

Contractor: _____ Date: _____

Barton Malow: _____ Date: _____

Owner: _____ Date: _____

Attendees' Signatures:		

Distribution:

**SECTION 01630
PRODUCT SUBSTITUTIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 WORK INCLUDED

- A. Furnish and install Products specified, under options and conditions for substitutions stated in this Section.

1.03 BIDDER'S OPTIONS

- A. For products that are specified only by reference standard, select Product meeting that is standard by any manufacturer.
- B. For Products specified by naming several Products or manufacturers, select any one of products and manufacturers named which complies with Specifications.
- C. For Products specified by naming several Products or manufacturers and stating "or equivalent", or "or equal", or "or Architect approved equivalent", or similar wording, submit a request as for substitutions, for any Product or manufacturer which is not specifically named for review and approval by the Architect.
- D. For Products specified by naming only one Product and manufacturer, there is no option and no substitution will be allowed.

PART 2 - SUBSTITUTION PROCESS

2.01 SUBSTITUTIONS

- A. Base Bid shall be in accordance with the Contract Documents.
- B.
 - 1. Substitutions for products may be made during the bidding period by submitting completed Substitution Request Form and substantiating product data/literature a minimum of ten (10) Days prior to Bid date to Barton Malow Company who will then forward to the Architect.
 - 2. Architect will consider requests from the Bidder for substitution of products in place of those specified as set forth in this section.
 - 3. Those submitted the specified calendar days prior to Bid Date will be included in an addendum if acceptable.
 - 4. After the end of the bidding period, requests will be considered only in case of Product unavailability or other conditions beyond the control of Contractor.
 - 5. Bid Proposals shall not be based on assumed acceptance of any item which has not been approved by addendum.
- C. Bidders are required to submit a separate Substitution Request Form for each proposed substitution. Each substitution request should be accompanied by the following supporting documentation:
 - 1. A full explanation of the proposed substitution.

2. Complete data substantiating compliance of the proposed substitution with the requirements stated in the Contract Documents.
 - a. Product identification, including the manufacturer's name and address.
 - b. Manufacturer's literature identifying:
 - 1) Product description and technical information.
 - 2) Reference standards.
 - 3) Performance and test data.
 - 4) Installation instructions, operating procedures and other like information.
 - c. Samples, as applicable.
 - d. Names and addresses of similar projects on which product has been used, and date of each installation.
 3. Itemized comparison of the proposed substitution with the product specified, listing all significant variations.
 4. Data relating to changes in delivery or construction schedule.
 5. A list of all effects of the proposed substitution on separate contracts.
 6. Accurate cost data comparing the proposed substitution with the product specified.
 - a. Amount of any net change to Contract Sum.
 7. Designation of required license fees or royalties.
 8. Designation of availability of maintenance services and sources of replacement materials.
- D. Substitutions will not be considered for acceptance when:
1. They are indicated or implied on shop drawings or product data submittals without a formal request from Bidder.
 2. Acceptance will require substantial revision of Contract Documents.
 3. In judgment of Architect, do not include adequate information necessary for a complete evaluation.
 4. If requested after Contract Award directly by a subcontractor or supplier, except for special or unusual circumstances reviewed by the **Contractor** with Barton Malow Company.
- E. Substitute products shall not be ordered or installed without written acceptance of Architect.
- F. Architect will determine acceptability of proposed substitution.

2.02 BIDDER'S REPRESENTATION

- A. In making formal request for substitution the Bidder represents that:
1. It has investigated the proposed product and has determined it is equivalent to or superior in all respects to the product specified.
 2. It will provide same warranties or bonds for the proposed substitution as required for the product specified.

3. It will coordinate installation of the accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.
 4. It waives all claims for additional costs caused by or arising from the substitution which may subsequently become apparent.
 5. Cost data is complete and includes related costs under its Agreement, but not:
 - a. Costs under separate contracts.
 - b. Architect's costs for redesign or revision of Contract Documents.
 6. Cost data need not be submitted, if request is for inclusion in an addendum. Requests after the Agreement is awarded shall contain a complete cost comparison.
- B. Any modifications necessary as a result of the use of an approved substitute shall be paid by the **Contractor** proposing the substitution.
- C. Any additional engineering costs required to be performed by the Architect to approve, implement or coordinate the substitution above reasonable review services, shall be paid by the **Contractor** proposing the substitution.
- D. Under no circumstances will the Architect be required to prove that a product proposed for substitution is or is not equal to the quality of the product specified.

2.03 ARCHITECT'S DUTIES

- A. Review requests for substitutions with reasonable promptness.
- B. Coordinate review/approval of "Architect Approved" substitutions with the Owner prior to notifying the Barton Malow Company.
- C. Issue a written instruction of decision to accept the substitution.
- D. Substitution requests that are not approved will be returned to the party submitting the request with an explanation for the rejection.

2.04 SUBSTITUTION REQUEST FORM

- A. The form is attached to this Section.
- B. **SUBSTITUTIONS WILL BE CONSIDERED ONLY WHEN THE ATTACHED FORM IS COMPLETED AND INCLUDED WITH THE SUBMITTAL WITH ALL BACKUP DATA.**

SUBSTITUTION REQUEST FORM

TO: **BARTON MALOW COMPANY/KINGSCOTT ASSOCIATES**
1301 Boyd
Troy, MI 48083
PH – 248-823-4631 FAX – 248-823-4672

We hereby submit for your consideration the following product instead of the specified item for the above Project:

DRAWING NO.: _____	<u>DRAWING NAME:</u> _____		
<u>SPEC. SECT.</u> _____	<u>SPEC. NAME</u> _____	<u>PARAGRAPH</u> _____	<u>SPECIFIED ITEM</u> _____

Proposed Substitution:

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

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.

CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

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

Submitted by:

_____	_____
Signature	Title

Firm

Address

_____	_____
Telephone	Date

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

For use by Architect:

___ Accepted ___ Accepted as Noted

___ Not Accepted ___ Received Too Late

___ Insufficient Data Received

By: _____

Date: _____

Fill in Blanks Below: (Attach additional sheets as required)

For Use by Owner:

___ Accepted ___ Accepted as Noted

___ Not Accepted ___ Received Too Late

___ Insufficient Data Received

By: _____

Date: _____

- A. Does the Substitution affect dimensions shown on Drawings?
Yes ___ No ___ If yes, clearly indicate changes: _____
- B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?
Yes ___ No ___ If no, fully explain: _____
- C. What affect does substitution have on other contracts or other trades?

- D. What affect does substitution have on the delivery and construction schedule? _____
- E. Manufacturer's warranties of the proposed and specified items are: ___ Same ___ Different
If Different, explain on an Attachment
- F. Reason for Request: _____
- G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

- H. Accurate cost data comparing proposed substitution with product specified:

- I. This substitution will amount to a credit or an extra cost to the Owner of: _____ dollars
(\$ _____)

END OF SECTION 01630

**SECTION 01700
CONTRACT CLOSE-OUT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.
- B. Comply with requirements stated in Sections 00500, 00700, 00800 and in Specifications for administrative procedures in closing out the Work. Where this Section conflicts with another Section or the technical Specifications, the provision granting greater rights or remedies to the Owner Barton Malow Company, or imposing the greater duty, standard, responsibility or obligation on Contractor shall govern.

1.02 DEFINITIONS

- A. Close-out is the process of organizing the general project requirements near the end of contract time to evidence the completion of the Work. The time of close-out directly relates to "Substantial Completion." It can either be a single time period for the entire Work, or a series of time periods for individual parts of the Work, which have been certified as Substantially Complete at different dates. Unless otherwise defined in the Contract Documents

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

Substantial Completion of the Project is the stage when Project construction is sufficiently complete so the Owner can occupy or utilize the project for its intended use.

Final Completion of the Project is the stage when Certification of Substantial Completion has been issued by the Architect according to the terms and conditions of the Contract Documents and "approval of the Project Certificate for Payment has been received from the Architect (or Owner) and Barton Malow Company has received the proceeds of the Final Payment from the Owner in order to release final payment to the Contractor".

1.03 PROJECT COMPLETION

- A. Contract requirements shall be met when construction activities have successfully produced, in this order, these three Project completion milestones:
 - 1. Substantial Completion
 - 2. Final Completion
 - 3. Final Payment

PART 2 - CLOSE-OUT PROCESS

2.01 CONTRACT CLOSE OUT DOCUMENTATION

- A. Before processing the completion of all contractual responsibilities of a **Contractor**, and to expedite final payment to a **Contractor**, a detailed review of all contractual requirements will be performed along with compiling a list of deficiencies. Refer to Sections 00500, 00700 and 00800 for detailed requirements. Effective and timely contract close-out is the objective, but it also requires efficient and timely action of the

Contractor to provide the necessary punchlist completion Work, documents, materials, close-out documentation, and all other requirements set forth in the Contract Documents.

2.02 CLOSE-OUT PROCEDURE

- A. The following procedure and forms will be used to progress through the contract close-out stage in a productive and timely manner.

Step 1 PREPARATION FOR CONTRACT CLOSE-OUT

During the course of the Project, the **Contractor** will thoroughly review the Contract Documents as it relates to the requirements and obligations and gather and submit to Barton Malow Company the proper submittals, shop drawings, material certifications, waivers, certificates of insurance, bonds, and other contractual requirements impacting contract close-out.

Step 2 INITIATING THE FINAL CLOSE-OUT PROCESS

When nearing 75% completion of the Work, the **Contractor** will review the status of the Close-Out process with Barton Malow Company. The **Contractor's** contractual responsibilities will be reviewed and outstanding close-out and other submittals identified.

Step 3 OBTAINING THE CERTIFICATE OF SUBSTANTIAL COMPLETION

As the **Contractor** is nearing the completion of the Work and after concurrence with Barton Malow Company, it shall submit a written request for Substantial Completion, all required documentation as outlined, and a listing of all minor deficiencies yet to be completed.

The following documents are the minimum required at the time of request for Substantial Completion. **Contractor** shall also submit all additional documentation as required in the Contract Documents:

- a. AIA G704 Certificate of Substantial Completion
- b. As-built records (see Section 01720)
- c. Operation and Maintenance Manuals (see Section 01730)
Typically, all O&M manuals will be submitted to the Owner six months prior to acceptance of equipment systems or building occupancy
- c. Keys, Maintenance Stock, and Spare Parts - quantities as required in the specifications
- d. Test and Start-up/Owner Operational Instruction Sessions (see Section 01750)
- e. Submission of Permits and Approvals (i.e., Fire Marshal, Department of Public Health Approvals, etc.)
- f. Guarantee and Warranties (see Section 01740)
- h. Punchlist (list of work to be completed or corrected)

Once Barton Malow Company has received all required documents they will be forwarded to the Architect and Owner. Barton Malow Company will review the **Contractor's** request for Substantial Completion; all above documentation, and list of deficiencies, add appropriate comments, and forward to the Architect and/or Owner for review. In conjunction with the **Contractor**, Barton Malow Company will establish a schedule for the completion of all listed

items, which in no event shall exceed any time periods established in the Contract Documents for Final Completion.

When the Architect and/or Owner determine(s) that the Work is substantially complete, the Certificate of Substantial Completion shall be issued to the **Contractor**.

Step 4 CONTRACTOR COMPLETES PUNCHLIST WORK

Each **Contractor** shall submit a letter certifying all punchlist items are completed, in a manner acceptable to the Owner, Barton Malow Company and the Architect.

Step 5 FINAL INSPECTION NOTICE

Each **Contractor** is to forward (**written notice and accompanying documentation**) to Barton Malow Company that Work is ready for final inspection and acceptance. Barton Malow Company will forward written notice to the Architect if Barton Malow Company is in agreement that Work is complete. The Architect will perform a final inspection and sign off on the punchlist form if Work is in fact completed. If punchlist work is not found complete, the **Contractor** shall take action to remedy any insufficiencies and then shall re-submit the written notice and accompanying documentation that Work is ready for **final** inspection and acceptance. If Barton Malow Company and/or Architect are required to perform “**more than 2**” site visits to determine Substantial or Final Completion of **Contractor**’s Work, the costs for such additional inspections shall be charged to **Contractor**.

The following documents are the minimum required to complete final payment. **Contractor** shall also submit all additional documentation as required in the Contract Documents:

- a. Final Payment Request (on G702 & G703)
- b. Guarantees/Warranties (including subs and suppliers)
- c. Final Sworn Statements (including subs and suppliers)
- d. Acknowledgment of Payment and Partial Unconditional Release
- e. Final Release Subcontractor/Materialman
- f. Certified Payroll Report (projects governed by prevailing wage laws)
- g. Verification of Rate Classification and Payment (Federal projects)
- h. Consent of Surety Company to Final Payment (AIA G707)
- i. Consent of Surety to Reduction or Partial Release of Retainage (AIA G707A)
- j. Certificate of Substantial Completion (on G704)
- k. Completion and acceptance of all punchlist Work
- l. LEED Required documentation

Items b, c, d and e must always be submitted with the final request for payment.

Step 6 REVIEW OF FINAL PAYMENT REQUEST

Barton Malow Company and the Architect will review the **Contractor's** final payment request and Close-Out file. **Barton Malow Company reserves the right to withhold 200% of the estimated cost for each punchlist item not completed until complete.** If all administrative documents are attached or have been submitted (i.e. guarantee, warranty, waiver of lien, etc.), all Work is complete, and all other responsibilities are met, the Project Team will forward the Contractor's Application for Final Payment to the Owner and payment shall be processed according to the Owner's regular procedures.

2.03 FINAL COMPLETION

- A. To attain final completion, the **Contractor** shall complete activities pertaining to Substantial Completion, and complete Work on punch list items. Only then shall it issue written request to Barton Malow Company to conduct a site visit to determine Final Completion.
- B. When **Contractor** considers the Work is finally complete, it shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - 5. Work is completed and ready for final observation.
- C. Barton Malow Company and/or Architect will make an observation to verify the status of completion with reasonable promptness after receipt of such certification.
- D. Should Barton Malow Company and/or Architect consider that the Work is incomplete or defective:
 - 1. Barton Malow Company will promptly notify the **Contractor** in writing, listing the incomplete or defective Work.
 - 2. **Contractor** shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Barton Malow Company that the Work is complete.
 - 3. Barton Malow Company and/or Architect will re-inspect the Work.
- E. When Barton Malow Company and/or Architect determines that the Work is acceptable under the Contract Documents, it shall request the **Contractor** to make close-out submittals.

2.04 CONTRACTOR'S CLOSE-OUT SUBMITTALS

- A. Evidence of compliance with requirements of governing authorities (state, local or federal):
 - 1. Certificates of Inspection:
 - a. Mechanical
 - b. Electrical
 - c. Others as required
- B. Project Record Documents: Refer to requirements of Section 01720.

- C. Operating and Maintenance Data, Instructions to Owner's Personnel: Refer to requirements of Section 01730.
- D. Warranties and Bonds: Refer to requirements of Individual Sections and Individual Technical Specifications and Section 01740.
- E. Spare Parts and Maintenance Materials: Refer to requirements of Individual Technical Specifications.
- F. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions and Section 01290.
- G. LEED Required Documentation

END OF SECTION 01700

**SECTION 01720
PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. Each **Contractor** shall be responsible to maintain at the job site one copy of:
1. Record Contract Drawings
 2. Record Project Manual
 3. Addenda
 4. Reviewed/Approved Shop Drawings
 5. Change Orders
 6. Other modifications to Contract
 7. Field test records
 8. Affidavits
- B. Store documents apart from documents used for construction.
- C. Maintain documents in clean, dry, legible condition.
- D. Do not use project record documents for construction purposes.
- E. Make documents available for inspection by the Owner, Barton Malow Company and the Architect.
- F. Failure to maintain documents up-to-date will be cause for withholding payments to **Contractor**.
- G. At the outset of the project, obtain from the Architect through the Barton Malow Company, at no charge to the **Contractor**, one complete set of Contract Documents including:
1. Technical Specifications with all addenda.
 2. One complete set of prints of all Drawings.

1.03 RECORDING

- A. Label each document "Project Record".
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings:
1. **Contractor** may at his option enter required information on a "working set" and then at completion of Project transfer the information to final submitted "Project Record" set.
 2. **Contractor** shall legibly mark to record actual construction:
 - a. Depths of various elements of foundation in relation to survey data.
 - b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

- c. Location and depths of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - d. Field changes of dimension and detail.
 - e. Changes made by PCO – Notice to Proceed
 - f. Details not on original Contract Drawings.
- E. Technical Specifications and Addenda:
1. **Contractor** shall legibly mark up each section to record:
 - a. Manufacturer, trade name, catalog number and Supplier of each product and item of equipment actually installed.
 - b. Changes made by PCO - Notice to Proceed.
 - c. Other items not originally specified.
- F. Conversion of Schematic Layouts:
1. Arrangement of conduits, circuits, piping, ducts and similar items are in most cases shown schematically on the Drawings.
 2. **Contractor** shall legibly mark to record actual construction:
 - a. Dimensions accurate to within 1" of the center of items shown schematically.
 - b. Identify each item, for example, "cast iron drain", "galvanized water", etc.
 - c. Identify location of each item, for example, "under slab", "in ceiling plenum", "exposed", etc.
 3. The Owner, Architect or Barton Malow Company may waive requirements of schematic layout conversion, when in their opinion, it serves no beneficial purpose. Do not, however, rely on waivers being issued except as specifically issued by the Barton Malow Company in written form.

1.04 SUBMITTAL

- A. At completion of Project deliver, one (1) original and Two (2) copy sets of Record Documents, in a format acceptable to the Owner and the Architect, using the Final Document Submittal Form (in Section 01600 Forms), to Barton Malow Company prior to request for final payment.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 1. Date
 2. Project title and number
 3. Contractor's name and address
 4. Title and number of each record document
 5. Certification that each document as submitted is complete and accurate
 6. Signature of Contractor, or his authorized representative

END OF SECTION 01720

**SECTION 01730
OPERATIONS AND MAINTENANCE DATA**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 SCOPE

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
 - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of the Technical Specifications.
- B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems in accordance with the requirements in Section 01750 Systems Demonstration, Operational Instruction and Start-up.

1.03 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of described products.
 - 2. Familiar with requirements of this Section.
 - 3. Skilled as technical writer to the extent required to communicate essential data.
 - 4. Skilled as draftsman competent to prepare required drawings.

1.04 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.
- B. Format:
 - 1. Size: 8-1/2" x 11"
 - 2. Paper: white, for typed pages.
 - 3. Text: Manufacturer's printed data, or neatly typewritten.
 - 4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold larger drawings to size of text pages.
 - 5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
 - 6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS." list:
 - a. Title of Project.
 - b. Identity of separate structures as applicable.
 - c. Identity of general subject matter covered in the manual.
- C. Binders:
 - 1. Commercial quality three-ring binders with durable and cleanable plastic covers.

2. Maximum ring size: 3"
3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
 1. Contractors, name of responsible principal, address and telephone number.
 2. A list of each product required to be included, indexed to content of the volume.
 3. List with each product, name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
 1. Include only those sheets which are pertinent to the specific product.
 2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- C. Drawings:
 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts or equipment and systems.
 - b. Control and flow diagrams.
 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 3. Contractor may use Project Record Documents as maintenance drawings - coordinate with Barton Malow Company.
- D. Written text, as required to supplement product data for the particular installation:
 1. Organize in consistent format under separate headings for different procedures.
 2. Provide logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued.
 1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties or bonds.

1.06 MANUAL REVIEW AND PREPARATION SCHEDULE

- A. Submit two copies of preliminary draft of proposed formats and outlines of contents to Barton Malow Company prior to start of preparation.
 1. Architect will review draft and return one copy with comments.
- B. Submit two (2) copies of completed data in final form to the Barton Malow Company at least six (6) months before the end of the project, for Owner review.

- 1. Copy will be returned after final inspection or acceptance, with comments.
- C. Submit copies of completed operation and maintenance manuals at least two (2) weeks before execution and have at hand for use in demonstrations and instructions.
- D. Submit specified number of copies of approved data in final form to the Barton Malow Company ten (10) days after final inspection or acceptance.

PART 2 - PRODUCTS

2.01 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two (2) copies of complete manual in final form.
- B. Content, for architectural products, applied materials and finishes:
 - 1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
 - 2. Instructions for care, maintenance and preventative maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods which are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
- C. Content, for moisture-protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance and repair.
- D. Additional requirements for maintenance data: Reference sections of Technical Specifications.

2.02 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two (2) copies of complete manual in final form.
- B. Content, for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shutdown and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance and Preventative Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and re-assemble.

- d. Alignment, adjusting and checking.
 4. Servicing and lubrication schedule.
 - a. List of lubricants required.
 5. Manufacturer's printed operating and maintenance instructions.
 6. Description of sequence of operation by control manufacturer.
 7. Original manufacturer's parts, list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 8. As-installed control diagrams by controls manufacturer.
 9. Each Contractor's coordination drawings.
 - a. As-installed color coded piping diagrams.
 10. Charts of valve tag numbers, with location and function of each valve.
 11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 12. Other data as required under pertinent sections of specifications.
- C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts.
 - a. Function, normal operating characteristics and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. Circuit directories of panel boards.
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. As-installed color coded wiring diagrams.
 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 5. Maintenance and preventative maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and re-assemble.
 - d. Adjustment and checking.
 6. Manufacturer's printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent sections of specifications.
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- E. Additional requirements for operating and maintenance data: Reference sections of Technical Specifications.

END OF SECTION 01730

**SECTION 01740
WARRANTIES AND GUARANTEES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention as directed to Bidding and Contract Requirements, and to Division 1, General requirements, which are hereby made part of this section.

1.02 SUMMARY

- A. This section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties:
1. Refer to General Conditions for terms of the Contractor's period and obligations for Correction of the Work.
- B. Related Sections: The following sections also contain requirements that relate to this section:
1. Division 1 Section "Contract Close-out" specifies contract close-out procedures.
 2. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.
 3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. **Standard Product Warranties** are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by manufacturer to Owner.
- B. **Special Warranties** are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Deliver all written warranties and guarantees required by the Contract Documents with the Owner and Barton Malow Company named as beneficiaries. All warranties shall include labor and materials, shall be signed by the manufacturer or subcontractor as the case may be, and countersigned by the Contractor. All written warranties shall be addressed to the Owner and delivered to Barton Malow Company upon completion of the Project, before or with the submission of Request for Final Payment.
- B. In addition to all other warranties set forth in the Contract Documents or imposed by applicable law, Contractor warrants to Owner and Barton Malow Company that the Work will be free from defects and performed in strict conformity with the requirements of the Contract Documents. This warranty survives the termination of the Agreement and shall only be extinguished by limitation periods imposed by applicable law and shall not be limited by any other provisions contained in the Agreement, including any provisions or time periods related to Contractor's obligation to correct defective Work.

- C. Contractor, upon signing the Agreement, shall obtain and forward to Barton Malow Company any and all Standard Product Warranties for products, materials and systems covered under its Agreement. The Manufacturer's warranties do NOT relieve the Contractor from its warranty obligations under the Contract Documents.
- D. Special Warranties shall become effective on a date established by the Project Team. This date generally shall be the date of Final Completion of the Project or Substantial Completion of the Project or portions thereof as agreed upon by the Project Team. In the case of acceptance of a portion of the Work or Project, separate warranties shall be issued for those specific portions of the Project that were accepted, and shall be dated the date the specific portion was accepted. As additional Work is accepted, separate warranties for those specific portions of the Work shall be issued and properly dated. Issuance of warranties for a portion of the Work shall in no way become the basis for Application for Final Payment.
- E. If for any reason, the Bidder cannot warrant any part of the Work using products, materials, or construction methods that have been specified or shown, it shall notify Barton Malow Company in writing at least ten (10) days before the bid submission date, giving reasons together with the names of products and data on substitutions it can guarantee. Should the Bidder fail to so notify Barton Malow Company within this time period, it will be bound to all warranties and guarantees as set forth in the Contract Documents.
- F. Related Damages and Losses: In correcting Work that has been rejected as defective or otherwise failing to conform to the Contract Documents, whether before or after Substantial Completion, Contractor shall bear all related costs, including, but not necessarily limited to, the cost to correct the Work, the cost to correct all other Work that has been damaged by the defective or non-conforming Work, or that is damaged in the process of correcting the defective or nonconforming Work, and the cost of all additional testing and inspections and compensation for the Architect and/or Barton Malow Company's services and expenses made necessary thereby.
- G. Reinstatement of Warranty: When Work covered by a warranty with a specific time period has failed and has been corrected by Contractor, the warranty shall be reinstated for a time period equal to the original warranty.
- H. Express warranties are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available to the Owner or Barton Malow Company under the law. Express warranty periods shall not be interpreted as limitations on the time in which Owner or Barton Malow Company may enforce Contractor's duties and obligation or their rights and remedies under the Agreement and applicable law.
1. Rejection of Warranties: The Owner and Barton Malow Company reserve the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- I. Where the Contract Documents require a Special Warranty, or similar commitment on the Work or part of the Work, the Owner and Barton Malow Company reserve the right to refuse to accept the Work, until the Contractor presents evidence that the entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

- A. Submit one (1) original and one (1) copy of written warranties to the Barton Malow Company within fourteen (14) days of Substantial Completion using the form found in section 01600-Forms and organizing the warranty documents into an orderly sequence based on the table of contents of the Project Manual. If the project Team's Certificate of Substantial Completion designates a commencement date

for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of Barton Malow Company.

- B. When the Contract Documents require Contractor, or Contractor and a Subordinate Party to execute a Special Warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Barton Malow Company for approval prior to final execution.
- C. Forms for warranties are included in Section 01600-Forms. Prepare a written document utilizing the appropriate form, ready for execution by Contractor and its Subordinate Party(ies). Submit a draft to Barton Malow Company for approval prior to final execution.
 - 1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting Special Warranties.

END OF SECTION 01740

1. Equipment/System Acceptance - This form will be completed for each piece of equipment or system for each contract that requires operational testing and/or Operational Instruction before acceptance. This will document the date of testing, the equipment tested, names of personnel which witnessed the testing and acceptance.
 2. Owner Operational Instruction - This form will be completed for each contract that requires Operational Instruction to be provided to the Owner's personnel. This will document the date of Operational Instruction, type of Operational Instruction, names of the personnel trained and acceptance of the Operational Instruction.
- B. The amount of time required for instruction on each item of equipment and system is that specified in individual sections or as mutually agreed upon between Contractor and Barton Malow Company.
- C. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.
- D. Use operation and maintenance manuals as basis of instruction and review the contents of the manuals with personnel in full detail to explain all aspects of operations and maintenance.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

END OF SECTION 01750

SPECIFICATIONS

FOR

TROY SCHOOL DISTRICT BID PACKAGE NO. 9393

ATHENS HIGH SCHOOL
CONCESSIONS REMODELING
TROY SCHOOL DISTRICT
TROY, MICHIGAN

FEBRUARY 1, 2007

A/E #2643-20

OWNER

TROY SCHOOL DISTRICT
4400 LIVERNOIS ROAD
TROY, MICHIGAN 48098
(248) 823-4000

ARCHITECTS/ENGINEERS

KINGSCOTT ASSOCIATES, INC
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(269) 381-4880

STRUCTURAL ENGINEER

JDH ENGINEERING
3000 IVANREST, S.W., SUITE B
GRANDVILLE, MICHIGAN 49418
(616) 531-6020

CONSTRUCTION MANAGER

BARTON MALOW COMPANY
26500 AMERICAN DRIVE
SOUTHFIELD, MICHIGAN 49034
(248) 436-5000

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

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Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 01230
ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. A-1: Remove existing doors and frames as designated on plans. Patch masonry at demolition work. Sand and clean existing steel lintels. Replace doors and frames with new aluminum frames and FRP doors as shown on door schedule to fit in existing masonry openings. Repaint steel lintels to match aluminum frames and spot paint existing block to match adjacent surfaces.
- B. Alternate No. A-2: Provide permanent awning on North, East and West sides of the building as described on the drawings. Omit "S4" light fixtures on exterior walls of the building. Awning manufacturer shall supply light fixtures mounted in frame work of awning.

END OF SECTION 01230

SECTION 01731
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building.
 - 2. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 3. Division 7 Section "Through-Penetration Firestop Systems" for patching fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Primary operational systems and equipment.

2. Mechanical systems piping and ducts.
 3. Control systems.
 4. Communication systems.
 5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Equipment supports.
 4. Piping, ductwork, vessels, and equipment.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01731

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Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 01732
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Salvage of existing items to be reused or recycled.
- B. Related Sections include the following:
 - 1. Division 1 Section "Cutting and Patching" for cutting and patching procedures.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.5 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.

- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, preconstruction videotapes and templates.
 - 1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 1 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly. Comply with requirements in Division 1 Section "Construction Waste Management."

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Comply with requirements specified in Division 1 Section "Construction Waste Management."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

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

3.8 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Items to be Removed and Reinstalled: Water heater.
- B. Existing Items to be Removed and Reinstalled by Owner: Existing retractable awning and all existing food equipment listed on Kitchen Equipment Schedule unless noted above. See Drawing A1.2

END OF SECTION 01732

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

- 1. Footings.
- 2. Foundation walls.
- 3. Slabs-on-grade. (Herein, but not part of this bid package).
- 4. Concrete toppings. (Herein, but not part of this bid package).

- B. Related Sections include the following:

- 1. Division 2 Section "Earthwork".
- 2. Division 2 Section "Cement Concrete Pavement" for concrete pavement and walks.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.

- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete." Sections 1 through 5 and Section 7, "Lightweight Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Plain-Steel Wire: ASTM A 82, as drawn.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 1. Portland Cement: ASTM C 150, Type I/II, Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F.

- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: As noted on drawings.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
 - 1. Available Products:
 - a. Boral Material Technologies, Inc.; Boral BCN.
 - b. Euclid Chemical Company (The); Eucon CIA.
 - c. Grace Construction Products, W. R. Grace & Co.; DCI.
 - d. Master Builders, Inc.; Rheocrete CNI.
 - e. Sika Corporation; Sika CNI.

2.6 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
 - 1. Available Products:
 - a. Monofilament Fibers:
 - 1) Axim Concrete Technologies; Fibrasol IIP.
 - 2) Euclid Chemical Company (The); Fiberstrand 100.
 - 3) FORTA Corporation; Forta Mono.

- 4) Grace Construction Products, W. R. Grace & Co.; Grace MicroFiber.
- 5) Metalcrete Industries; Polystrand 1000.
- 6) SI Concrete Systems; Fibermix Stealth.

b. Fibrillated Fibers:

- 1) Axim Concrete Technologies; Fibrasol F.
- 2) Euclid Chemical Company (The); Fiberstrand F.
- 3) FORTA Corporation; Forta.
- 4) Grace Construction Products, W. R. Grace & Co.; Grace Fibers.
- 5) SI Concrete Systems; Fibermesh.

2.7 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Available Manufacturers:

- a. Bometals, Inc.
- b. Greenstreak.
- c. Meadows, W. R., Inc.
- d. Murphy, Paul Plastics Co.
- e. Progress Unlimited, Inc.
- f. Tamms Industries, Inc.
- g. Vinylex Corp.

2. Profile: Flat, dumbbell with center bulb.
3. Dimensions: 6 inches by 3/8 inch thick; nontapered.

2.8 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

1. Available Products:

- a. Fortifiber Corporation; Moistop Plus.
- b. Raven Industries Inc.; Dura Skrim [6] [8].
- c. Reef Industries, Inc.; Griffolyn Type-[65] [85].
- d. Stego Industries, LLC; Stego Wrap, 10 mils.

- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- G. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, non-load bearing and IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.12 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, according to ACI 301.
1. Use a qualified independent 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: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
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 heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Proportion normal weight concrete mixtures as indicated on drawings.
- B. Air entrain concrete exposed to freeze/thaw cycles 6% + or – 1%.

2.14 FABRICATING REINFORCEMENT

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

2.15 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch, Class C, 1/2 inch, Class D, 1 inch for rough-formed finished surfaces, not exposed to view.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Locate joints for slabs, joists, and girders in the middle third, if not shown on drawings.
 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 2. 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 Division 7 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.9 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
 - 1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

- a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure **two** sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03300

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 04810
UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units (CMUs).
 - 2. Face brick for reference only.
 - 3. Mortar and grout.
 - 4. Reinforcing steel.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Miscellaneous masonry accessories.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - 2. Division 7 Section "Through-Penetration Firestop Systems" for firestopping at openings in masonry walls.
 - 3. Division 7 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
- C. Products installed, but not furnished, under this Section include the following:
 - 1. Steel lintels for unit masonry, furnished under Division 5 Section "Metal Fabrications."

1.3 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths (f_m) at 28 days.
- B. Determine net-area compressive strength (f_m) of masonry by testing masonry prisms according to ASTM C 1314.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

- A. 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, through one source from a single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for typical exterior wall in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in each mockup.
 - 2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
 - 3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
 - 4. Protect accepted mockups from the elements with weather-resistant membrane.
 - 5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- 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.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed 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 ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide bullnose units for outside corners, unless otherwise indicated.
- B. Concrete Masonry Units: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 2. Weight Classification: Medium or normal weight, unless otherwise indicated.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.4 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout.

Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 BRICK

- A. General: Provide shapes indicated and as follows:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
- B. Face Brick: ASTM C 216, Grade SW, Type FBX. Reuse salvaged brick and brick already purchased by Troy Schools. No additional brick needs to be purchased.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
 2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
 3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 4. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 11-5/8 inches long to match existing.
 5. Application: Use where brick is exposed, unless otherwise indicated.
 6. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.
 7. Color and Texture: To match existing.

2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Mortar Cement: ASTM C 1329.
1. Products:
 - a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
 - b. Standard gray mortar to match existing.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products:
 - a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
 - b. Davis Colors; True Tone Mortar Colors.
 - c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

- F. Aggregate for Mortar: ASTM C 144.
 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

- G. Aggregate for Grout: ASTM C 404.

- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 1. Products:
 - a. Addiment Incorporated; Mortar Kick.
 - b. Euclid Chemical Company (The); Accelguard 80.
 - c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
 - d. Sonneborn, Div. of ChemRex; Trimix-NCA.

- I. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

- B. Masonry Joint Reinforcement, General: ASTM A 951.
 1. Interior Walls: Hot-dip galvanized, carbon steel.
 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 3. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
 4. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

- D. Masonry Joint Reinforcement for Multiwythe Masonry:
 1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.

2.8 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
 2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
 3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- D. Partition Top anchors: 0.097-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with Division 7 Section "Sheet Metal Flashing and Trim" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.
 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 4. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 5. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - a. Products:
 - 1) Advanced Building Products Inc.; Peel-N-Seal.
 - 2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier-44.
 - 4) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 5) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
 - 6) Hohmann & Barnard, Inc.; Textroflash.
 - 7) Polyguard Products, Inc.; Polyguard 300.
 - 8) Polytite Manufacturing Corp.; Poly-Barrier Self-Adhering Wall Flashing.
 - 9) Williams Products, Inc.; Everlastic MF-40.
 2. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch thick.
 - a. Products:
 - 1) Carlisle Coatings & Waterproofing; Pre-Kleened EPDM Thru-Wall Flashing.
 - 2) Firestone Building Products; FlashGuard.
 - 3) Heckmann Building Products Inc.; No. 81 EPDM Thru-Wall Flashing.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Sheet Metal Flashing and Trim."
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products: Use one of the following, unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

a. Products:

- 1) Advanced Building Products Inc.; Mortar Maze weep vent.
- 2) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
- 3) Heckmann Building Products Inc.; No. 85 Cell Vent.
- 4) Hohmann & Barnard, Inc.; Quadro-Vent.
- 5) Wire-Bond; Cell Vent.

2. Aluminum Weep Hole/Vent: One-piece, L-shaped units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel with louvers stamped in web and with a top flap to keep mortar out of the head joint; painted before installation to comply with Division 9 painting Sections in color approved by Architect to match that of mortar.

a. Products:

- 1) Hohmann & Barnard, Inc.; #343W - Wilko Weep Hole.

E. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

1. Products:

- a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
- b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
- c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
- d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers:

- a. Diedrich Technologies, Inc.

- b. EaCo Chem, Inc.
- c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 - 3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.
 - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
- D. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - 4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry to match existing adjacent masonry work; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height, unless noted. Provide for lateral bracing at force of 280 lb./ft. (code). At "longer" walls, bracing force provided by structure above, as detailed. At shorter walls, construct with one or two bond beams at top of wall, anchored at ends, and built up to underside of structure as follows:
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to

provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.

3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.

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

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

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

3.5 COMPOSITE MASONRY

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

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.

2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

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

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

1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

- C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
1. Provide individual metal ties not more than 16 inches o.c.
 2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
- C. Form expansion joints in brick made from clay or shale as follows:
1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants."

3.8 LINTELS

- A. Install steel lintels where indicated.

- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.9 FLASHING, WEEP HOLES AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and 1-1/2 inches into the inner wythe.
 - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
- C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
 - 1. Use specified weep/vent products to form weep holes.
 - 2. Space weep holes 24 inches o.c., unless otherwise indicated.
- D. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.

3.10 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.11 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04810

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 05120 STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Structural steel.
- 2. Grout.

- B. Related Sections include the following:

- 1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
- 2. Division 5 Section "Steel Deck" for field installation of shear connectors.
- 3. Division 5 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
- 4. Division 9 painting Sections for surface preparation and priming requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.

2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

B. Construction: Type 2, simple framing.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
5. For structural-steel connections indicated to comply with design loads, include structural analysis data prepared by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For fabricator and professional engineer.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
4. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
5. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 1. Weight Class: Standard U.N.O.
 2. Finish: Black, except where indicated to be galvanized.
- F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 1. Finish: Plain.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.
- C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- D. Headed Anchor Rods: ASTM F 1554, Grade 36 straight.

1. Nuts: ASTM A 563 heavy hex carbon steel.
 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 3. Washers: ASTM F 436 hardened carbon steel.
 4. Finish: Plain.
- E. Threaded Rods: ASTM A 193/A 193M.
1. Nuts: ASTM A 563 heavy hex carbon steel.
 2. Washers: ASTM F 436 hardened carbon steel.
 3. Finish: Plain.
- F. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.4 GROUT

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 1. Camber structural-steel members where indicated.
 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 3. Mark and match-mark materials for field assembly.
 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.
- G. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches o.c., unless otherwise indicated.
- H. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened U.N.O.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials.
 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
 3. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
 4. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 5. SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."
 6. SSPC-SP 8, "Pickling."
 7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
 8. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
 9. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
1. Fill vent holes and grind smooth after galvanizing.
 2. Galvanize lintels attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
 - 1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of base plate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened U.N.O.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds.
- B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
 - 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05120

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Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 05500
METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
1. Steel framing and supports for countertops.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 4. Loose bearing and leveling plates.
 5. Steel weld plates and angles for casting into concrete not specified in other Sections.
- B. Products furnished, but not installed, under this Section include the following:
1. Loose steel lintels.
- C. Related Sections include the following:
1. Division 4 Section "Unit Masonry Assemblies" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
 2. Division 5 Section "Structural Steel."

1.3 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

B. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

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

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- G. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
 - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Furnish inserts if units are installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.7 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Galvanize loose steel lintels located in exterior walls.

2.8 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.

2.9 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

2.10 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05500

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SECTION 06105
MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Wood blocking and nailers.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency

certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
 1. Use treatment that does not promote corrosion of metal fasteners.
 2. Use Exterior type for exterior locations and where indicated.
 3. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings, and the following:
 1. Wood nailers and blocking.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.

3. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 15 percent maximum moisture content and any of the following species:
 1. Western woods; WCLIB or WWPA.
 2. Northern species; NLGA.
 3. Eastern softwoods; NeLMA.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 1. Eastern softwoods, No. 2 Common grade; NELMA.
 2. Northern species, No. 2 Common grade; NLGA.
 3. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with double dipped, hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.
- C. Wood Screws: ASME B18.6.1.
- D. Lag Bolts: ASME B18.2.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring,

nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Do not splice structural members between supports, unless otherwise indicated.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
 - 4. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
 - 5. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
 - 6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PROTECTION

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

- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06105

SECTION 07841
THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
 - 1. Division 15 Sections specifying duct and piping penetrations.
 - 2. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers and smoke barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

- a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
- 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. **Installation Responsibility:** Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.
- C. **Source Limitations:** Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- D. **Fire-Test-Response Characteristics:** Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
- 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application on Drawings that are produced by one of the following manufacturers:
 - 1. Grace, W. R. & Co. - Conn.
 - 2. Hilti, Inc.
 - 3. Johns Manville.
 - 4. 3M; Fire Protection Products Division.
 - 5. Tremco; Sealant/Weatherproofing Division.
 - 6. USG Corporation.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07841

SECTION 07920
JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

- 1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints in unit masonry.
 - b. Joints between different materials listed above.
 - c. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - d. Control and expansion joints in ceilings and other overhead surfaces.
 - e. Other joints as indicated.
- 2. Exterior joints in the following horizontal traffic surfaces:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - c. Other joints as indicated.
- 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
 - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - f. Other joints as indicated.
- 4. Interior joints in the following horizontal traffic surfaces:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.

B. Related Sections include the following:

1. Division 4 Section "Unit Masonry Assemblies" for masonry control and expansion joint fillers and gaskets.
2. Division 7 Section "Through-Penetration Firestop Systems" for sealing joints in fire-resistance-rated construction.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:
 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Twenty years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- D. Multicomponent Nonsag Urethane Sealant **ES-1**:
 - 1. Products:
 - a. Pecora Corporation; Dynatrol II.

- b. Tremco; Dymeric 511.
 - c. Tremco; Vulkem 922.
2. Type and Grade: M (multicomponent) and NS (nonsag).
 3. Class: 50.
 4. UseRelated to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, ceramic tile and wood.

2.4 LATEX JOINT SEALANTS

- A. Latex Sealant **LS-1**: Comply with ASTM C 834, Type P, Grade NF.
- B. Products:
 1. Pecora Corporation; AC-20+.
 2. Sonneborn, Division of ChemRex Inc.; Sonolac.
 3. Tremco; Tremflex 834.

2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or

harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

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

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07920

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08110
STEEL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Standard hollow metal frames.

B. Related Sections:

- 1. Division 4 Section "Unit Masonry Assemblies" for embedding anchors for hollow metal work into masonry construction.
- 2. Division 8 Section "Door Hardware" for door hardware for doors.
- 3. Division 9 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

- 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- 2. Locations of reinforcement and preparations for hardware.
- 3. Details of each different wall opening condition.
- 4. Details of anchorages, joints, field splices, and connections.
- 5. Details of moldings, removable stops, and glazing.

C. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Amweld Building Products, LLC.

2. Benchmark; a division of Therma-Tru Corporation.
3. Ceco Door Products; an Assa Abloy Group company.
4. Curries Company; an Assa Abloy Group company.
5. Pioneer Industries, Inc.
6. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
 1. Fabricate frames with mitered or coped corners.
 2. Fabricate frames as face welded unless otherwise indicated.
 3. Frames for Doors: 0.053-inch-thick steel sheet.
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

- 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.6 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

- C. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

- 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 5. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

- 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

- 6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

- D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

- E. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door

Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

2.7 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Install door silencers in frames before grouting.
 - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - e. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.

- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08110

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08311
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for ceilings.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

1.4 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- B. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film

thickness not less than 1.5 mils. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.

- C. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR CEILINGS

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

1. Babcock-Davis; A Cierra Products Co.
2. J. L. Industries, Inc.
3. Karp Associates, Inc.
4. Larsen's Manufacturing Company.
5. Milcor Inc.
6. Williams Bros. Corporation of America (The).

- B. Flush Access Doors and Trimless Frames: Fabricated from steel sheet.

1. Locations: Ceiling surfaces.
2. Door: Minimum 0.060-inch- thick sheet metal, set flush with surrounding finish surfaces.
3. Frame: Minimum 0.060-inch- thick sheet metal with drywall bead flange.
4. Hinges: Spring-loaded, concealed-pin type.
5. Latch: Cam latch operated by screwdriver with interior release.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. For trimless frames with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08311

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08331
OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following types of manually operated overhead coiling doors:
 - 1. Counter doors.

1.3 DEFINITIONS

- A. Operation Cycle: One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Exterior overhead coiling doors shall withstand the wind loads, the effects of gravity loads, and loads and stresses within limits and under conditions indicated according to SEI/ASCE 7.
 - 1. Wind Loads: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 - 2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
- B. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. wind load, acting inward and outward.
- C. Windborne-Debris-Impact-Resistance Performance: Provide glazed and impact-protective overhead coiling doors that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and ASTM E 1996.
 - 1. Large Missile Test: For overhead coiling doors located within 30 feet of grade.

D. Operation-Cycle Requirements: Provide overhead coiling door components and operators capable of operating for not less than 20,000 cycles.

1. Include tamperproof cycle counter.

1.5 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's product data.

C. Samples for Verification: Color sample of exposed finish required.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural and Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

PART 2 - PRODUCTS

2.1 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel (SS) sheet; complying with ASTM A 653/A 653M, G90 (Z275) coating designation.

a. Minimum Base-Metal (Uncoated) Thickness: 0.028 inch.

b. Flat profile slats.

c. Metal Interior Curtain Slat Facing: Match metal of exterior curtain slat face.

B. Endlocks for Counter Doors: Manufacturer's standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Counter Doors: Manufacturer's standard continuous channel or tubular shape, either stainless-steel or aluminum extrusions with vinyl astragal to suit type of curtain slats.

D. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide

adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.2 HOOD

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Galvanized Steel: Nominal 0.028 inch thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.
 - 2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant joint head profile for applying joint sealant.

2.3 COUNTER DOORS

- A. Integral Frame, Hood, and Fascia for Counter Door: Welded sheet metal assembly of the following sheet metal:
 - 1. Galvanized Steel: Nominal 0.064-inch- thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.

2.4 LOCKING DEVICES

- A. Slide Bolt at Counter Doors: Fabricate with side-locking bolts to engage through slots in tracks located on both left and right jamb sides, operable from coil side.

2.5 CURTAIN ACCESSORIES

- A. Weatherseals: Equip each exterior door with weather-stripping gaskets fitted to entire perimeter of door for a weathertight installation, unless otherwise indicated.
 - 1. At door head, use 1/8-inch- thick, replaceable, continuous sheet secured to inside of hood.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.
- B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.
 - 1. Provide pull-down straps or pole hooks for doors more than 84 inches high.

2.6 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to door curtain with

barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate.

2.7 MANUAL DOOR OPERATORS

- A. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.
- B. Push-up Door Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.

2.8 DOOR ASSEMBLY

- A. Counter Door: Overhead coiling door formed with curtain of interlocking metal slats.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cookson Company.
 - b. Cornell Iron Works, Inc.
 - c. McKeon Rolling Steel Door Company, Inc.
 - d. Overhead Door Corporation.
 - e. Raynor.
 - f. Wayne-Dalton Corp.
- B. Operation Cycles: Not less than 20,000.
 - 1. Include tamperproof cycle counter.
- C. Door Curtain Material: Galvanized steel.
- D. Door Curtain Slats: Flat profile slats of 1-1/2-inch at counter doors and 2-5/8-inch at service doors center-to-center height.

- E. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
- F. Integral Frame, Hood, and Fascia for Counter Door: Galvanized steel.
 - 1. Mounting: Between jambs.
- G. Sill Configuration for Counter Door: No sill.
- H. Locking Devices: Equip door with locking device assembly.
 - 1. Locking Device Assembly: Cremone type, both jamb sides locking bars, operable from inside with thumb turn.
- I. Manual Door Operator: Manufacturer's standard push-up operation.
- J. Door Finish:
 - 1. Baked-Enamel or Powder-Coated Finish: Color matching Architect's sample.
 - 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.9 FINISHES, GENERAL

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STEEL AND GALVANIZED STEEL FINISHES

- A. Baked Finish: Manufacturer's standard baked finish consisting of primer and topcoat according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.
 - 1. Color and Gloss: Match Architect's sample. Match bronze anodized finish at aluminum door frames.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install coiling doors and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports.

3.2 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with weathertight fit around entire perimeter.
- B. Accessibility: Install overhead coiling doors, switches and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide weathertight fit around entire perimeter.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors. Refer to Division 1 Section.

END OF SECTION 08331

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Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08411
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Exterior aluminum door frames.

- B. Related Sections include the following:

1. Division 7 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
2. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Failure includes the following:
a. Deflection exceeding specified limits.
b. Thermal stresses transferred to building structure.
c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
d. Noise or vibration created by wind and thermal and structural movements.
e. Loosening or weakening of fasteners, attachments, and other components.
f. Sealant failure.

- g. Failure of operating units to function properly.
- B. Structural Loads:
- 1. Wind Loads: As indicated on Drawings.
- C. Deflection of Framing Members:
- 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
- D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
- 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity but not less than 10 seconds.
- E. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.
- G. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- H. Water Penetration Under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- 1. Maximum Water Leakage: No uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

- I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.
- J. Average Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
- K. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having minimum STC 32 according to ASTM E 413 and an OITC 26 according to ASTM E 1332, as determined by testing according to ASTM E 90.

1.4 SUBMITTALS

- A. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
- B. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals and other materials beyond normal weathering.
 - d. Water leakage through fixed glazing and framing areas.
 - e. Failure of operating components to function properly.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cross Aluminum Products.
 - 2. Kawneer, 500 Tuffline.
 - 3. Tubelite Inc., Monumental.
 - 4. United States Aluminum, Durafront.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B 209.
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Structural Profiles: ASTM B 308/B 308M.

2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard heavy duty extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 2. Reinforce members as required to receive fastener threads.
- D. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
- E. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."
- B. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.5 FABRICATION

- A. Form aluminum shapes before finishing.
- B. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing from interior.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C. Storefront Framing: Fabricate components for assembly using screw-spline system.

- D. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- E. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
 - 1. Color: As selected by Architect from full range of industry colors and color densities to match aluminum finish at ticket booth.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 - 6. Seal joints watertight, unless otherwise indicated.

- B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, without warp or rack.
- F. Entrances: Install to produce smooth operation and tight fit at contact points.
1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
 2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- G. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- H. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
 3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch.

3.3 ADJUSTING

- A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.
1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

END OF SECTION 08411

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08412
FIBERGLASS REINFORCED POLYESTER DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Exterior and interior manual-swing fiberglass reinforced polyester (FRP) doors.

- B. Related Sections include the following:

- 1. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. Wind-Load Test Certification conforming to TAS 202-95.1 and ASTM E 330.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire resistance ratings and finishes.

- B. Shop Drawings: Include the following:

- 1. Elevations and details of each door design.
- 2. Schedule of doors.
- 3. Locations of reinforcement and preparations for hardware.
- 4. Details of connections and trim.
- 5. Thickness of materials and joints.

- C. Other Action Submittals:
 - 1. Schedule: Provide a schedule of work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on drawings. Coordinate with door hardware schedule.
- D. Samples for Initial Selection: For units with factory-applied color finishes.
- E. Hardware Templates: Provide finish hardware mounting details.
- F. Warranties: Special warranties specified in this section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain FRP doors through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver FRP doors palletized or crated to provide protection during transit and Project-site storage. Doors shall be side protected with surrounding grooved 2-inch by 4-inch wood frame and covered with 275-pound test corrugated cardboard.
- B. Unload and store FRP doors with minimum handling. Inspect delivered doors for damage. Remove damaged items and replace with new.
- C. Store products under cover in manufacturer's unopened packaging until installation.
 - 1. Place units on minimum 4-inch wood blocking.
 - 2. Avoid non-vented plastic or canvas covers.
 - 3. Remove packaging immediately if packaging becomes wet.
 - 4. Provide ¼ inch air spaces between stacked doors.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of openings by field measurements before fabrication.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace FRP doors that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Defects in workmanship and materials, including warping, rotting, decaying or bowing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 10 years from date of Substantial Completion.
- B. Installer's Warranty: Installer shall warrant installation procedures and performance for five years against defects due to workmanship and materials handling.

PART 2 - PRODUCTS

2.1 FRAME MANUFACTURERS

- A. FRP (Fiberglass Reinforced Polyester): Where FRP doors are scheduled, provide products from one of the following manufacturers:
1. Special-Lite, Inc.
 2. Commercial Door
 3. Kawneer.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
- B. Components: From same manufacturer.
- C. Fasteners: Aluminum or 18-8 stainless steel.

2.3 FRP DOORS

- A. FRP Door Face Sheet:
1. Embossed fiberglass reinforced polyester (F.R.P.) 0.120" thick.
 2. Core of flush doors to be froth-in-place urethane foam at 2.5 lb./cu. ft. density and to have zero ozone depletion potential and contains no CFC's or HCHC's.
 - a. Fire door core: As required to provide fire-protection ratings indicated.
- B. Door Hardware: As specified in Division 8 Section "Door Hardware".

2.4 ACCESSORY MATERIALS

- A. Fasteners: Aluminum, nonmagnetic stainless steel or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

1. No exposed fasteners.
- B. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.5 FABRICATION

- A. Doors: Reinforce doors as required for installing hardware.
 1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum $\frac{3}{4}$ inch beyond edge of door on which astragal is mounted.
- B. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
- C. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
 1. Color: As selected by Architect from full range of industry colors and color densities. To match aluminum finish at ticket booth.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.
 2. Separate dissimilar metals to prevent electrolytic action between metals.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
4. Fire rated doors: Install doors with clearances according to NFPA 80.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

C. Install components plumb and true in alignment with established lines and grades, without warp or rack.

3.3 ADJUSTING

A. Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.

B. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

END OF SECTION 08412

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 08710
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware for the following:
 - a. Swinging doors.
- B. Related Sections include the following:
 - 1. Division 8 Section "Aluminum-Framed Entrances, Storefronts and Curtain Walls" for door hardware, listed in section 08710 including cylinders.
- C. Products and Services furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

1.3 SUBMITTALS

- A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Qualification Certification: For Architectural Hardware Consultant.
- C. Warranty: Special warranty specified in this Section.
- D. Other Action Submittals:
 - 1. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

- a. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
- b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, and material of each door and frame.
 - 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
 - 3) Complete designations of every item required for each door or opening including name and manufacturer.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) Door and frame sizes and materials.
- c. Submittal Sequence: Submit the door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in 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 sets.

1.4 QUALITY ASSURANCE

- A. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- B. Keying: All Corbin/Ruswin lock cylinders shall be provided in the proper keyway, by the hardware supplier. Keying of the cylinders will be by the hardware supplier.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

1.6 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to

confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

- B. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.7 WARRANTY

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

- 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of operators and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- 2. Warranty Period: One year from date of Substantial Completion, except as follows:
 - a. Locksets: One year from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: Ten years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets listed in door and frame schedule and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products listed in hardware sets or those listed as acceptable.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the "Door Hardware Sets."
 2. References to BHMA Standards: Provide named products complying with these standards and requirements for description, quality, and function.
- C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, those manufacturers specified or named as acceptable.

2.2 HINGES, GENERAL

- A. Hinges: Unless otherwise indicated, provide the following:
1. Exterior Doors: Heavy-duty continuous aluminum gear hinges.
 2. Doors with Closers: Heavy-duty continuous aluminum gear hinges.
 3. Interior Doors: Heavy-duty continuous aluminum gear hinges.
 4. Exterior Hinges: Aluminum gear hinges anodized after machining.
- B. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 2. Screws: Phillips flat-head; Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Hinges: BHMA A156.1. Listed under Category A in BHMA's "Certified Product Directory."
1. Bommer Industries, Inc. (BOM).
 2. Hager Companies (HAG).
 3. Ives, an Ingersol-Rand company. (IVE)
 4. McKinney Products Company; an ASSA ABLOY Group company (MCK).
 5. Pemko, (PEM).
 6. Select products. (SEL).

2.4 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." ANSI A117.1. FED-STD-795, "Uniform Federal Accessibility Standards." 2003 Michigan Building Code.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Lock Trim:
 1. Levers: Wrought.
 2. Roses: Wrought.
 3. Lockset Designs: Corbin/Russwin LWA.
- D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 1. Mortise Locks: Minimum 3/4-inch (19-mm) latch bolt throw.
 2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- E. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- F. Strikes: Manufacturer's standard strike with strike box for each latch bolt or lock bolt, with lip extended to protect frame, finished to match door hardware set, and as follows:
 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 1. Mortise Locks: BHMA A156.13.
- B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13, Grade 1; Series 1000. Listed under Category F in BHMA's "Certified Product Directory."
 1. Acceptable Manufacturer:
 - a. Corbin Russwin; an ASSA Abloy group company (C-R). "No-Substitution"

2.6 KEYING

1. Keying System: The contractor shall be responsible for providing correct 6 pin keyway cylinders to match existing building system, and keying new cylinders. The contractor shall meet with Mondo Belardi of Troy schools to obtain master and grand master keys for keying work, and assure that correct keyway cylinders are provided for new doors in additions or for new door openings in the existing buildings.

2.7 OPERATING TRIM

- A. Standard: BHMA A156.6 and as listed in hardware sets.
- B. Materials: Fabricate from stainless steel, unless otherwise indicated.
- C. Acceptable Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. IVES Hardware; an Ingersoll-Rand Company (IVE).
 - 3. Rockwood Manufacturing Company (ROC).
 - 4. Trimco (TRI).

2.8 CLOSERS

- A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." ANSI A117.1. FED-STD-795, "Uniform Federal Accessibility Standards." 2003 Michigan Building Code.
 - 1. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
- C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- D. Surface Closers: BHMA A156.4, Grade 1. Listed under Category C in BHMA's "Certified Product Directory." Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
 - 1. Acceptable Manufacturer:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN). "No-Substitution".
- E. Size: 2 inches (38 mm) less than door width on push side and 1 inch (13 mm) less than door width on pull side, by height specified in door hardware sets.
- F. Fasteners: Manufacturer's standard machine or self-tapping screws.
- G. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from material indicated in door hardware sets.

1. Material: 0.050-inch- (1.3-mm-) thick stainless steel.
2. Available Manufacturers:
 - a. Hager Companies (HAG).
 - b. IVES Hardware; an Ingersoll-Rand Company (IVE).
 - c. Rockwood Manufacturing Company (ROC).
 - d. Trimco (TRI).

2.9 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
 1. Provide wall stops for doors unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where wall or floor stops are not appropriate, provide overhead holders.
- B. Mechanical Door Holders: BHMA A156.16, Grade 1.
- C. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.
- D. Acceptable Manufacturers:
 1. Architectural Builders Hardware Mfg., Inc. (ABH).
 2. Glynn Johnson; an Ingersoll-Rand Company (GLY).
 3. Hager Companies (HAG).
 4. IVES Hardware; an Ingersoll-Rand Company (IVE).
 5. Rockwood Manufacturing Company (ROC).
 6. Trimco (TRI).

2.10 THRESHOLDS

- A. Standard: BHMA A156.21. Listed under Category J in BHMA's "Certified Product Directory."
- B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." ANSI A117.1. FED-STD-795, "Uniform Federal Accessibility Standards."
 1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.
- D. Available Manufacturers:
 1. Hager Companies (HAG).
 2. National Guard Products (NGP).
 3. Pemko Manufacturing Co. (PEM).

4. Reese Enterprises (RE).

2.11 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Steel Machine or Wood Screws: For the following fire-rated applications:
 - a. Mortise hinges to doors.
 - b. Strike plates to frames.
 - c. Closers to door frames.
 - 3. Steel Through Bolts: For the following fire-rated and non-rated applications even if door blocking is provided:
 - a. Closers to doors.
 - 4. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 6. Install door closers and door holders with sex-bolts.

2.12 FINISHES

- A. Standard: BHMA A156.18, as indicated in door hardware sets.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, 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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 Series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise 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."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 1 Section "Demonstration and Training."

3.8 DOOR HARDWARE SETS

SPECWORKS # 58703-B66Y3JV6Z

HW SET: A01

DOOR NUMBER:

102A

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30 X LHB	630	C-R
1	EA	ADA PULL	8103EZ-0 X C/C	630	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	SURFACE CLOSER	4111 EDA X ST3447	689	LCN
1	EA	OVERHEAD STOP	814S	630	GLY
1	EA	THRESHOLD	424 36"	AL	NGP

1 SET WEATHER SEAL SUPPLY WITH DOOR AND FRAME ASSEMBLY

MOUNT LEVER AT 48" INSIDE ABOVE PUSH PLATE

HW SET: A02

DOOR NUMBER:
103A

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30	630	C-R
1	EA	FLUSH PULL	1111A	630	TRI
1	EA	SURFACE CLOSER	4116 EDA	689	LCN
1	EA	WALL STOP & HOLDER	WS45X	626	IVE
1	EA	THRESHOLD	424 48"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

LEVER INSIDE CYLINDER AND FLUSH PULL OUTSIDE

HW SET: A03

DOOR NUMBER:
103B

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1	630	C-R
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	WALL STOP & HOLDER	WS40	626	IVE

HW SET: A04

DOOR NUMBER:
103C

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30 X LHB	630	C-R
1	EA	FLUSH PULL	1111A	630	TRI
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	SURFACE CLOSER	4116 EDA	689	LCN
1	EA	WALL STOP & HOLDER	WS45X	626	IVE
1	EA	THRESHOLD	424 72"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

HW SET: A05

DOOR NUMBER:

101E

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30	630	C-R
1	EA	FLUSH PULL	1111A	630	TRI
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	WALL STOP & HOLDER	WS40	626	IVE
1	EA	THRESHOLD	896N 36"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

HW SET: A06

DOOR NUMBER:

102B 104A

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30 X LHB	630	C-R
1	EA	ADA PULL	8103EZ-0	630	IVE
1	EA	PUSH PLATES	92 4" X 15 3/4" C/C	630	ROC
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	WALL STOP	WS401CVX	626	IVE
1	EA	THRESHOLD	424 36"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

MOUNT LEVER AT 48" INSIDE ABOVE PULL PLATE

HW SET: A07

DOOR NUMBER:

104B

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30 X LHB	630	C-R
1	EA	ADA PULL	8103EZ-0 X C/C	630	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	WALL STOP & HOLDER	WS40	626	IVE
1	EA	THRESHOLD	424 36"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

MOUNT LEVER AT 48" INSIDE ABOVE PULL PLATE

HW SET: A08

DOOR NUMBER:

104C

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1 X M30 X LHB	630	C-R
1	EA	ADA PULL	8103EZ-0 X C/C	630	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	WALL STOP & HOLDER	WS40	626	IVE
1	EA	THRESHOLD	424 36"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

MOUNT LEVER AT 48" INSIDE ABOVE PUSH PLATE

HW SET: A09

DOOR NUMBER:

105

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11 HD	628	SEL
1	EA	STOREROOM LOCK	ML2057 LWA X1-67B1	630	C-R
1	EA	WALL STOP & HOLDER	WS45X	626	IVE
1	EA	THRESHOLD	424 32"	AL	NGP
1	SET	WEATHER SEAL	SUPPLY WITH DOOR AND FRAME ASSEMBLY		

HW SET: A10

DOOR NUMBER:

101A 101B 101C 101D

EACH TO HAVE:

1		COILING DOOR	NO HARDWARE REQUIRED		UNK
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END OF SECTION 08710

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Additions and Remodeling
Troy School District
Troy, Michigan

SECTION 09111
NON-LOAD-BEARING STEEL FRAMING

1.1 GENERAL

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

1.2 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).
- B. Related Sections include the following:
 - 1. Division 7 Section "Fire-Resistive Joint Systems" for head-of-wall joint systems installed with non-load-bearing steel framing.

PART 2 - PRODUCTS

2.1 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
 - 1. Depth: 1-1/2 inches.
- E. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
 - 1. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 - 2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install bracing at terminations in assemblies.
- C. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 4. Do not attach hangers to steel roof deck.
 - 5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 - 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09111

SECTION 09215
GYPSUM VENEER PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Gypsum veneer plaster and gypsum base for veneer plaster.
- B. Related Sections include the following:
 - 1. Division 9 Section "Non-Load-Bearing Steel Framing" for non-load-bearing steel framing and other components of gypsum veneer plaster assemblies.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by a testing and inspecting agency.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.
- C. Stack panels flat on leveled supports off floor or slab to prevent sagging.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 843 requirements or gypsum veneer plaster manufacturer's written recommendations, whichever are more stringent.

- B. Room Temperatures: Maintain not less than 55 deg F or more than 80 deg F for 7 days before application of gypsum base and gypsum veneer plaster, continuously during application, and after application until veneer plaster is dry.
- C. Avoid conditions that result in gypsum veneer plaster drying too rapidly.
 - 1. Distribute heat evenly; prevent concentrated or uneven heat on veneer plaster.
 - 2. Maintain relative humidity levels, for prevailing ambient temperature, that produce normal drying conditions.
 - 3. Ventilate building spaces in a manner that prevents drafts of air from contacting surfaces during veneer plaster application until it is dry.
- D. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM VENEER PLASTER MATERIALS

- A. High-Strength, Two-Component Gypsum Veneer Plaster: ASTM C 587, ready-mixed, base-coat plaster and smooth finish-coat veneer plaster containing mill-mixed, fine silica sand; with a compressive strength of 3000 psi when tested according to ASTM C 472.

2.2 PANEL PRODUCTS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Gypsum Base for Veneer Plaster: ASTM C 588/C 588M.
 - 1. Type X: 5/8 inch thick.

2.3 TRIM ACCESSORIES

- A. Standard Trim: ASTM C 1047, provided or approved by manufacturer for use in gypsum veneer plaster applications indicated.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Control joints.

2.4 JOINT REINFORCING MATERIALS

- A. General: Comply with joint strength requirements in ASTM C 587 and with gypsum veneer plaster manufacturer's written recommendations for each application indicated.
- B. Joint Tape:
 - 1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for applications indicated.
- C. Embedding Material for Joint Tape:
 - 1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for use with joint-tape material and gypsum veneer plaster applications indicated.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced product standards and manufacturer's written recommendations.
- B. Bonding Agent: ASTM C 631, polyvinyl acetate.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

2.6 GYPSUM VENEER PLASTER MIXES

- A. Mechanically mix gypsum veneer plaster materials to comply with ASTM C 843 and with gypsum veneer plaster manufacturer's written recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING PANELS, GENERAL

- A. Gypsum Base for Veneer Plaster: Apply according to ASTM C 844 unless manufacturer's written recommendations are more stringent.
 - 1. Do not allow gypsum base to degrade from exposure to sunlight as evidenced by fading of paper facing.

2. Erection Tolerance: No more than 1/16-inch offsets between planes of gypsum base panels, and 1/8 inch in 8 feet noncumulative, for level, plumb, warp, and bow.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
 - C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
 - D. Locate edge and end joints over supports except in ceiling applications where intermediate supports or back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints, other than control joints, at corners of framed openings.
 - E. Attach panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
 - F. Attach panels to framing provided at openings and cutouts.
 - G. Form control joints with space between edges of adjoining panels.
 - H. Cover both sides of steel stud partition framing with panels in concealed spaces, including above ceilings, except in internally braced chases.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit panels around ducts, pipes, and conduits.
 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints; seal joints with acoustical sealant.
 - I. Fastener Spacing: Comply with ASTM C 844, manufacturer's written recommendations, and fire-resistance-rating requirements.
 1. Space screws a maximum of 12 inches o.c. along framing members for wall or ceiling application.

3.3 INSTALLING PANELS

- A. Install gypsum base panels for veneer plaster in the following locations:
 1. Type X: Where required for fire-resistance-rated assembly.
- B. Single-Layer Application:
 1. On ceilings, apply gypsum base panels before wall panels, to the greatest extent possible and at right angles to framing, unless otherwise indicated.
- C. Single-Layer Fastening Methods: Apply gypsum base panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install according to ASTM C 844 and in specific locations approved by Architect.
- C. Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.

3.5 INSTALLING JOINT REINFORCEMENT

- A. Gypsum Base for Veneer Plaster: Reinforce interior angles and flat joints with joint tape and embedding material to comply with ASTM C 843 and with gypsum veneer plaster manufacturer's written recommendations.

3.6 GYPSUM VENEER PLASTERING

- A. Bonding Agent: Apply bonding agent on dry cementitious backer units according to gypsum veneer plaster manufacturer's written recommendations.
- B. Gypsum Veneer Plaster Application: Comply with ASTM C 843 and with veneer plaster manufacturer's written recommendations.
 - 1. Two-Component Gypsum Veneer Plaster:
 - a. Base Coat: Trowel apply base coat over substrate to uniform thickness of 1/16 to 3/32 inch. Fill all voids and imperfections.
 - b. Finish Coat: Trowel apply finish-coat plaster over base-coat plaster to uniform thickness of 1/16 to 3/32 inch.
 - 2. Where gypsum veneer plaster abuts only metal door frames, windows, and other units, groove finish coat to eliminate spalling.
 - 3. Do not apply veneer plaster to gypsum base if paper facing has degraded from exposure to sunlight. Before applying veneer plaster, use remedial methods to restore bonding capability to degraded paper facing according to manufacturer's written recommendations and as approved by Architect.
- C. Concealed Surfaces: Do not omit gypsum veneer plaster behind cabinets, furniture, furnishings, and similar removable items. Omit veneer plaster in the following areas where it will be concealed from view in the completed Work unless otherwise indicated or required to maintain fire-resistance and STC ratings.
- D. Gypsum Veneer Plaster Finish: Smooth-troweled finish, unless otherwise indicated to match existing.

3.7 PROTECTION

- A. Protect installed gypsum veneer plaster from damage from weather, condensation, construction, and other causes during remainder of the construction period.
- B. Remove and replace gypsum veneer plaster and gypsum base panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that gypsum base panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that gypsum base panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09215

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 09911 EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Galvanized metal.
 - 2. Steel.
- B. Related Sections include the following:
 - 1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 9 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. ICI Paints.
 - 3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- B. Colors: Match Architect's Samples (existing similar spaces).

2.3 METAL PRIMERS

- A. Cementitious Galvanized-Metal Primer: MPI #26.
 - 1. VOC Content: E Range of E1.
- B. Alkyd Anticorrosive Metal Primer: MPI #79.
 - 1. VOC Content: E Range of E1.

2.4 EXTERIOR ALKYD PAINTS

- A. Exterior Alkyd Enamel (Semigloss): MPI #94 (Gloss Level 5).
 - 1. VOC Content: E Range of E1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Alkyd System: MPI EXT 5.3B.
 - a. Prime Coat: Cementitious galvanized-metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (semigloss).
- B. Steel Substrates:
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (semigloss).

END OF SECTION 09911

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 09912
INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

- 1. Concrete.
- 2. Concrete masonry units (CMU).
- 3. Steel.
- 4. Galvanized metal.
- 5. Plaster.

- B. Related Sections include the following:

- 1. Division 9 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
- C. Product List: For each product indicated, include the following:
 - 1. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. ICI Paints.
2. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As indicated in a color schedule at the end of this section.

2.3 BLOCK FILLERS

A. Interior/Exterior Latex Block Filler: MPI #4.

2.4 PRIMERS/SEALERS

A. Interior Latex Primer/Sealer: MPI #50.

2.5 METAL PRIMERS

A. Alkyd Anticorrosive Metal Primer: MPI #79.

2.6 LATEX PAINTS

A. Interior Latex (Flat): MPI #53 (Gloss Level 1).

B. Interior Latex (Semigloss): MPI #54 (Gloss Level 5).

2.7 ALKYD PAINTS

A. Interior Alkyd (Semigloss): MPI #47 (Gloss Level 5).

2.8 FLOOR COATINGS

A. Interior/Exterior Clear Concrete Floor Sealer (Solvent Based): MPI #104. Finish indicated in plans as SC.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 1. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
 1. Alkyd Floor Enamel System: MPI INT 3.2B.
 - a. Prime Coat: Exterior/interior alkyd floor enamel (gloss).
 - b. Intermediate Coat: Exterior/interior alkyd floor enamel (gloss).
 - c. Topcoat: Exterior/interior alkyd floor enamel (gloss).
- B. CMU Substrates:
 1. Waterborne Epoxy System: MPI INT 4.2J
 - a. Prime Coat: Interior/exterior latex block filler.

- b. Intermediate Coat: Waterborne polyamide epoxy matching topcoat.
 - c. Topcoat: Waterborne Polyamide Epoxy.
- C. Steel Substrates:
- 1. Alkyd System: MPI INT 5.1E.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Interior alkyd matching topcoat.
 - c. Topcoat: Interior alkyd (semigloss).
- D. Galvanized-Metal Substrates:
- 1. High-Performance Architectural Latex System: MPI INT 5.3M.
 - a. Prime Coat: Waterborne galvanized-metal primer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex (eggshell).
- E. Plaster Substrates:
- 1. High-Performance Architectural Latex System: MPI INT 9.2B.
 - a. Prime Coat: Interior latex primer/sealer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex satin.

PAINT SCHEDULE

IPS – 1 = ICI: Swiss Coffee #2012 (White).

IPS – 2 = Floor color as selected by Troy Schools. (Dark Red).

END OF SECTION 09912

SECTION 12355
INSTITUTIONAL CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Plastic-laminate-faced wood cabinets of stock design.
 - 2. Stainless-steel countertops.

1.3 DEFINITIONS

- A. Exposed Portions of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and surfaces visible in open cabinets.
- B. Semiexposed Portions of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semiexposed.
- C. Concealed Portions of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for institutional casework. Include plans, elevations, sections, details, and attachments to other Work.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of institutional casework manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain institutional casework through one source from a single manufacturer.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards," Section 1600.
 - 1. Provide AWI Quality Certification Program labels indicating that institutional casework complies with requirements.
- D. Quality Standard: Unless otherwise indicated, comply with WIC's "Manual of Millwork" for Custom grade.
 - 1. Provide WIC-certified compliance certificate indicating that institutional casework complies with requirements of grades specified.
- E. Product Designations: Drawings indicate sizes, configurations, and finish material of institutional casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish material, and complying with the Specifications may be considered. Refer to Division 1 Section "Product Requirements."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver institutional casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install institutional casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where institutional casework is indicated to fit to other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating institutional casework without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate layout and installation of metal framing and reinforcements in gypsum board assemblies for support of institutional casework.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of institutional casework that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Delamination of components or other failures of glue bond.
 - 2. Warping of components.
 - 3. Failure of operating hardware.
 - 4. Deterioration of finishes.
- B. Warranty Period: Ten years from date of Substantial Completion.

1.10 EXTRA MATERIALS

- A. Furnish complete touchup kit for each type and finish of institutional casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Plastic-Laminate-Faced Institutional Casework:
 - a. Case Systems, Inc.
 - b. LSI Corporation of America, Inc.
 - c. TMI Systems Design Corp.
 - d. Stevens.
 - 2. Plastic-Laminate Material:
 - a. Refer to Schedule.

2.2 MATERIALS

A. General:

1. Adhesives: Do not use adhesives that contain urea formaldehyde.
2. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
3. Hardwood Plywood: HPVA HP-1, either veneer core or particle core, unless otherwise indicated.
4. Softwood Plywood: DOC PS 1.
5. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
6. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
7. Hardboard: AHA A135.4, Class 1 Tempered.
8. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
9. Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick elsewhere.

B. Exposed Cabinet Materials:

1. Plastic Laminate: Type VGS.
 - a. Unless otherwise indicated, provide plastic laminate for exposed surfaces.
 - b. Provide plastic laminate for doors and drawer fronts and where indicated.

C. Semiexposed Cabinet Materials:

1. Plastic Laminate: Type VGS.
 - a. Provide plastic laminate for semiexposed surfaces, unless otherwise indicated.
 - b. Provide plastic laminate for interior faces of doors and drawer fronts and where indicated.

D. Concealed Cabinet Materials:

1. Plastic Laminate: Type BKL.

2.3 DESIGN, COLOR, AND FINISH

A. Design: Provide institutional casework of the following design:

1. Flush overlay with wire pulls. Pulls to be chrome in finish.

B. Melamine-Faced Particleboard Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.

C. Plastic-Laminate Colors and Finishes: As selected in Schedule.

2.4 CABINET FABRICATION

A. Plastic-Laminate-Faced Cabinet Construction:

1. Bottoms and Ends of Cabinets, Shelves, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, melamine faced on semiexposed surfaces.
2. Backs of Cabinets: 1/2-inch particleboard, plastic-laminate faced on exposed surfaces, melamine faced on semiexposed surfaces.
3. Drawer Fronts: 3/4-inch particleboard, plastic-laminate faced on both sides.
4. Drawer Sides and Backs: 1/2-inch melamine-faced particleboard, with glued dovetail or multiple-dowel joints.
5. Drawer Bottoms: 1/4-inch melamine-faced particleboard glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
6. Doors: 3/4-inch particleboard or medium-density fiberboard, plastic-laminate faced on both sides.
7. Custom, field installed base. Base to be 6" h and accommodate mechanical vents and grilles. Coordinate with mechanical drawings. Cabinet height listed in schedule is an overall height and includes base height. Plan cabinets accordingly. Refer to detail in drawings for more information.

B. Base Molding: ASTM F 1861, Type TP (rubber, vulcanized thermoset), 6 inches high. Provide on fronts and exposed sides of floor-mounted casework. Trim top of base as necessary to fit in space provided.

1. Style: B, cove with top-set toe.
2. Manufacturer: Provide: Johnsonite. In color as selected by Architect from manufacturer's full range.

C. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.

2.5 CASEWORK HARDWARE

A. Hardware, General: Provide manufacturer's standard powder-coated, commercial-quality, heavy-duty hardware complying with requirements indicated.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

B. Butt Hinges: Powder-coated, semiconcealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 hinges for doors less than 48 inches high and 3 hinges for doors more than 48 inches high.

C. Pulls: Solid aluminum wire pulls, fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches wide.

D. Door Catches: Powder-coated, nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.

- E. Drawer Slides: Powder-coated, metal-channel, self-closing drawer slides, designed to prevent rebound when drawers are closed, with nylon-tired, ball-bearing rollers, and complying with BHMA A156.9, Type B05091, and rated for the following loads:
 - 1. Box Drawer Slides: 150 lbs.
 - 2. File Drawer Slides: 100 lbs.
 - 3. Pencil Drawer Slides: 100 lbs.
 - 4. Keyboard Slide: 100 lbs.
- F. Drawer and Cupboard Locks: Cylindrical (cam) type, 5-pin tumbler, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.
 - 1. Provide a minimum of two keys per lock and six master keys.
 - 2. Provide locks on all doors and drawers.
- G. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

2.6 COUNTERTOPS

- A. Countertops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Provide front and end overhang of 1 inch over base cabinets.
- B. Stainless-Steel Tops: Made from 0.0625-inch- thick, stainless-steel sheet, ASTM A 666, Type 304, with No. 4 satin finish.
 - 1. Weld shop-made joints, and grind and polish surfaces to produce uniform, directional, textured, polished finish indicated, free of cross scratches. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 2. Sound deaden entire undersurface with heavy-build mastic coating.
 - 3. Extend top down to provide a 1-inch thickness and a 1/2-inch return flange under frame.
 - 4. Form backsplash coved to and integral with top surface. Coordinate with window openings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of institutional casework.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION

- A. Install plumb, level, and true; shim as required, using concealed shims. Where institutional casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 - 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- C. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- D. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF TOPS

- A. Field Jointing: Where possible make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
- B. Secure tops to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each front, end, and back.
- C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
- D. Seal junctures of top, splash, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

3.5 PLASTIC LAMINATE SCHEDULE

- A. PL-1: (Vertical and horizontal surfaces where plastic laminate is specified). Wilsonart, Sunstone #4781-60.

3.6 TAG SCHEDULE FOLLOWS

TROY ATHENS CONCESSION BLDG.

* STAINLESS STEEL COUNTERTOP TYPICAL.
 * COORDINATE WINDOW OPENINGS WITH INSTALLATION OF COUNTER. COUNTER TO EXTEND TO WINDOW OPENINGS, REFER TO PLAN.

TAG #	LSI STYLE #	TMI STYLE #	CASE STYLE#	STEVENS STYLE #	WIDTH	DEPTH	HEIGHT	DESCRIPTION	Notes
B-1	1000	B1050	B000	10101	36"	16"	36"	Open storage. 2 adjustable shelves	Locking of cabinets is typical unless noted otherwise (UNO) Locking
B-2	1000	B1050	B000	10101	21"	16"	36"	Open storage. 2 adjustable shelves	Locking
B-3	1102	D1122	B315	10432	24"	24"	36"	Drawer, door base cabinet. 2 hinged doors, 1 drawer, 1 adjustable shelf	Locking. Counter to be 26" deep.
B-3a	1002	B2052	B010	10129	36"	24"	34"	Door base cabinet. 2 hinged doors, 1 adjustable shelf	Locking. Counter to be 26" deep.
B-4	1001	B2062	B104	10181	48"	24"	34"	Door base cabinet. 2 hinged doors, 4 adjustable shelves, fixed vertical divider	Locking. Counter to be 26" deep.
B-5	1012	B2051	B010	10120	18"	24"	36"	Door base cabinet. 1 door hinged right, 1 adjustable shelf	Locking
B-6	1002	B2052	B010	10129	36"	24"	36"	Door base cabinet. 2 hinged doors, 1 adjustable shelf	Locking. Counter to be 32" deep.
B-7	1230	D3003	B403	10332	18"	24"	36"	(2) equal drawers, (1) large bottom drawer	Locking. Counter to be 32" deep.
B-8	1002 Mod.	B2052	B010	10129	24"	24"	36"	Door base cabinet. 2 hinged doors, 1 adjustable shelf	Locking
KS-1					60" +/-	24"	30"	Knee Space. ADA countertop. Stainless Steel.	Coordinate window openings.

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 15050
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Painting and finishing.
 - 10. Concrete bases.
 - 11. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Eslon Thermoplastics.
- B. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 - 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

D. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. PVC Pipe: ASTM D 1785, Schedule 40.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With setscrew.
 1. Finish: Polished chrome-plated.

- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With setscrew and chrome-plated finish.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting One-piece or split-casting, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge and set screw.

- L. Sleeves are not required for core-drilled holes.

- M. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- O. Verify final equipment locations for roughing-in.

- P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified in Division 9 Section "Interior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

END OF SECTION 15050

Kingscott Associates, Inc.
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Troy School District
Troy, Michigan

SECTION 15055 MOTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes basic requirements for factory- and field-installed motors.

1.3 DEFINITIONS

- A. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.

1.4 SUBMITTALS

- A. Product Data for Variable Frequency Drives: For each type and size of drive, provide nameplate data and ratings; operating weights; enclosure type and mounting arrangements; size, type and location of winding terminations; conduit entry and ground lug locations.
- B. Operation and Maintenance Data.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. Manufacturer's Qualifications: Firms regularly engaged in manufacture of variable frequency drives with characteristic, sizes and capacities required whose products have been in satisfactory use in similar service for not less than 5 years.

- D. UL and NEMA Compliance: Provide electric cabinets and components which are listed and labeled by Underwriters Laboratories and mounted in a NEMA1 enclosure for variable frequency drives.

1.6 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices and features that comply with the following:
 - 1. Compatible with the following:
 - a. Magnetic controllers.
 - b. Multispeed controllers.
 - c. Reduced-voltage controllers.
 - 2. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
 - 3. Matched to torque and horsepower requirements of the load.
 - 4. Matched to ratings and characteristics of supply circuit and required control sequence.
- B. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.
- C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.7 PRODUCT DELIVERY, STORAGE AND BUILDING

- A. Handle Variable Frequency Drive Panels carefully to prevent damage, breaking, denting and scoring. Do not install damaged panels or components; replace with new.
- B. Store Panels and Components in clean dry place. Protect from weather, dirt, fumes, water, construction debris and physical damage.

1.8 WARRANTY

- A. All Variable Frequency Drives shall be warranted for a period of 3 years from date of shipment. Any warranty expense during that time shall be born entirely by the manufacturer, including any travel costs or living expense necessary to repair in warranty equipment.

PART 2 - PRODUCTS

2.1 MOTOR REQUIREMENTS

- A. Motor requirements apply to factory- and field-installed motors except as follows:

1. Different ratings, performance, or characteristics for motor are specified in another Section.
2. Motorized-equipment manufacturer requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.2 MOTOR CHARACTERISTICS

- A. Motors 3/4 HP and Larger: Three phase.
- B. Motors Smaller Than 3/4 HP: Single phase.
- C. Frequency Rating: 60 Hz.
- D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
- E. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
- F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
- G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- H. Enclosure: Open dripproof.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Premium, as defined in NEMA MG 1.
- C. Stator: Copper windings, unless otherwise indicated.
 1. Multispeed motors shall have separate winding for each speed.
- D. Rotor: Squirrel cage, unless otherwise indicated.
- E. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.
- F. Temperature Rise: Match insulation rating, unless otherwise indicated.
- G. Insulation: Class F, unless otherwise indicated.
- H. Code Letter Designation:
 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.

- I. Enclosure: Cast iron for motors 7.5 hp and larger; rolled steel for motors smaller than 7.5 hp.
 - 1. Finish: Gray enamel.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Rugged-Duty Motors: Totally enclosed, with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings insulated with non-hygroscopic material.
 - 1. Finish: Chemical-resistant paint over corrosion-resistant primer.
- C. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
 - 1. Measure winding resistance.
 - 2. Read no-load current and speed at rated voltage and frequency.
 - 3. Measure locked rotor current at rated frequency.
 - 4. Perform high-potential test.

2.5 SINGLE-PHASE MOTORS

- A. Type: One of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split-phase start, capacitor run.
 - 3. Capacitor start, capacitor run.
- B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.
- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.
- D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.
- E. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
 - 1. Measure winding resistance.
 - 2. Read no-load current and speed at rated voltage and frequency.
 - 3. Measure locked rotor current at rated frequency.
 - 4. Perform high-potential test.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for conduit systems to verify actual locations of conduit connections before installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install panel where indicated, in accordance with manufacturer's published installation instructions, complying with recognized industry practices to ensure that control panels comply with requirements and serve intended purposes.
- B. Access: Provide access space around V-F panel for service as indicated, but in no case less than that recommended by manufacturer.
- C. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
- D. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 16 sections. Do not proceed with equipment start up until wiring installation is acceptable to equipment installer.

3.3 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain field-installed motors. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 15055

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Troy School District
Troy, Michigan

SECTION 15061
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following hangers and supports for mechanical system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Fastener systems.
 - 4. Pipe stands.
 - 5. Equipment supports.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. AAA Technology & Specialties Co., Inc.
 - 2. Bergen-Power Pipe Supports.
 - 3. B-Line Systems, Inc.; a division of Cooper Industries.
 - 4. Carpenter & Paterson, Inc.
 - 5. Empire Industries, Inc.
 - 6. ERICO/Michigan Hanger Co.
 - 7. Globe Pipe Hanger Products, Inc.
 - 8. Grinnell Corp.
 - 9. GS Metals Corp.
 - 10. National Pipe Hanger Corporation.
 - 11. PHD Manufacturing, Inc.
 - 12. PHS Industries, Inc.
 - 13. Piping Technology & Products, Inc.
 - 14. Tolco Inc.
- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.
 - 3. PHS Industries, Inc.
 - 4. Pipe Shields, Inc.
 - 5. Rilco Manufacturing Company, Inc.

6. Value Engineered Products, Inc.

- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 4. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 4. C-Clamps (MSS Type 23): For structural shapes.
 5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 6. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- D. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- F. Install lateral bracing with pipe hangers and supports to prevent swaying.
- G. Install building attachments to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping.
- H. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- J. Insulated Piping: Comply with the following:
 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used.
 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
5. Insert Material: Length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor when wall mounted.
- B. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 painting Sections.

- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 15061

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Troy, Michigan

SECTION 15075
MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:

- 1. Pipe markers.
- 2. Valve tags.
- 3. Valve schedules.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 - 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Shaped Pipe Markers: Preformed semirigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- C. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- D. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.2 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Architect. Provide 5/32-inch hole for fastener.
 - 1. Material: 3/32-inch-thick laminated plastic with 2 black surfaces and white inner layer.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.3 VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 15 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
 - 1. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 3/4 inch wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
 - 2. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
 - 3. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.
- B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.3 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.

2. Valve-Tag Color:
 - a. Cold Water: Blue.
 - b. Hot Water: Black.

3. Letter Color:
 - a. Cold Water: White.
 - b. Hot Water: White.

3.4 VALVE-SCHEDULE

- A. Provide Owner with type written copy of Valve Schedule in Maintenance Manual.

END OF SECTION 15075

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 15082
PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulation Materials:
 - a. Flexible elastomeric.
 - b. Mineral fiber.
 - c. Polyolefin.
 - 2. Insulating cements.
 - 3. Adhesives.
 - 4. Mastics.
 - 5. Lagging adhesives.
 - 6. Sealants.
 - 7. Factory-applied jackets.
 - 8. Tapes.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section "Hangers and Supports."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Aeroflex USA Inc.; Aerocel.
- b. Armacell LLC; AP Armaflex.
- c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

G. Mineral-Fiber, Preformed Pipe Insulation:

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
- 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

H. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Crimp Wrap.
 - b. Johns Manville; Micro Flex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Manson Insulation Inc.; AK Flex.
 - e. Owens Corning; Fiberglas Pipe and Tank Insulation.

I. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armacell LLC; Tubolit.
 - b. Nomaco Inc.; IMCOLOCK, IMCOSHEET, NOMALOCK, and NOMAPLY.
 - c. RBX Corporation; Therma-cell.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; Triple I.
 - b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aeroseal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
- D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Red Devil, Inc.; Celulon Ultra Clear.
 - e. Speedline Corporation; Speedline Vinyl Adhesive.

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; CP-30.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-35.
 - c. ITW TACC, Division of Illinois Tool Works; CB-25.
 - d. Marathon Industries, Inc.; 501.
 - e. Mon-Eco Industries, Inc.; 55-10.
- 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
 - 3. Service Temperature Range: 0 to 180 deg F.
 - 4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
 - 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; Encacel.
 - b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
 - c. Marathon Industries, Inc.; 570.
 - d. Mon-Eco Industries, Inc.; 55-70.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
 - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
 - 5. Color: White.

2.5 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-52.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-42.
 - c. Marathon Industries, Inc.; 130.
 - d. Mon-Eco Industries, Inc.; 11-30.
 - e. Vimasco Corporation; 136.
 - 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over equipment and pipe insulation.
 - 3. Service Temperature Range: Minus 50 to plus 180 deg F.
 - 4. Color: White.

2.6 SEALANTS

- A. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
 - 2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.

2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; Smoke Safe.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
 5. Factory-fabricated tank heads and tank side panels.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- C. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.

3.5 EQUIPMENT, TANK, AND VESSEL INSULATION INSTALLATION

- A. Mineral Fiber, Pipe and Tank Insulation Installation for Tanks and Vessels: Secure insulation with adhesive and anchor pins and speed washers.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of tank and vessel surfaces.
 - 2. Groove and score insulation materials to fit as closely as possible to equipment, including contours. Bevel insulation edges for cylindrical surfaces for tight joints. Stagger end joints.
 - 3. Protect exposed corners with secured corner angles.
 - 4. Install adhesively attached or self-sticking insulation hangers and speed washers on sides of tanks and vessels as follows:
 - a. Do not weld anchor pins to ASME-labeled pressure vessels.

- b. Select insulation hangers and adhesive that are compatible with service temperature and with substrate.
 - c. On tanks and vessels, maximum anchor-pin spacing is 3 inches from insulation end joints, and 16 inches o.c. in both directions.
 - d. Do not overcompress insulation during installation.
 - e. Cut and miter insulation segments to fit curved sides and domed heads of tanks and vessels.
 - f. Impale insulation over anchor pins and attach speed washers.
 - g. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
- 5. Secure each layer of insulation with stainless steel or aluminum bands. Select band material compatible with insulation materials.
 - 6. Where insulation hangers on equipment and vessels are not permitted or practical and where insulation support rings are not provided, install a girdle network for securing insulation. Stretch prestressed aircraft cable around the diameter of vessel and make taut with clamps, turnbuckles, or breather springs. Place one circumferential girdle around equipment approximately 6 inches from each end. Install wire or cable between two circumferential girdles 12 inches o.c. Install a wire ring around each end and around outer periphery of center openings, and stretch prestressed aircraft cable radially from the wire ring to nearest circumferential girdle. Install additional circumferential girdles along the body of equipment or tank at a minimum spacing of 48 inches o.c. Use this network for securing insulation with tie wire or bands.
 - 7. Stagger joints between insulation layers at least 3 inches.
 - 8. Install insulation in removable segments on equipment access doors, manholes, hand holes, and other elements that require frequent removal for service and inspection.
 - 9. Bevel and seal insulation ends around manholes, hand holes, ASME stamps, and nameplates.
 - 10. For equipment with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.
- B. Flexible Elastomeric Thermal Insulation Installation for Tanks and Vessels: Install insulation over entire surface of tanks and vessels.
 - 1. Apply 100 percent coverage of adhesive to surface with manufacturer's recommended adhesive.
 - 2. Seal longitudinal seams and end joints.

3.6 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular

- surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.

3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical centerline of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.7 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 MINERAL-FIBER INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.

2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.9 POLYOLEFIN INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.

4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.10 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
 - c. Polyolefin: 1/2 inch thick.
2. NPS 1-1/2 and Larger: Insulation shall be one of the following:

- a. Flexible Elastomeric: 1 inch thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- c. Polyolefin: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:

- 1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
 - c. Polyolefin: 1/2 inch thick.
- 2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - c. Polyolefin: 1 inch thick.

C. Roof Drain and Overflow Drain Bodies:

- 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. PVC: 20 mils thick.

END OF SECTION 15082

SECTION 15110
VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following general-duty valves:
 - 1. Copper-alloy ball valves.
 - 2. Ferrous-alloy ball valves.
 - 3. Bronze check valves.
- B. Related Sections include the following:
 - 1. Division 15 Section "Mechanical Identification" for valve tags and charts.
 - 2. Division 15 piping Sections for specialty valves applicable to those Sections only.

1.3 DEFINITIONS

- A. The following are standard abbreviations for valves:
 - 1. CWP: Cold working pressure.
 - 2. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 3. PTFE: Polytetrafluoroethylene plastic.
 - 4. SWP: Steam working pressure.
 - 5. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

- A. ASME Compliance: ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.
 - 1. Exceptions: Domestic hot- and cold-water piping valves unless referenced.
- B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 4. Set butterfly valves closed or slightly open.
 - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.
- B. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.
- C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- D. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

E. Valve Actuators:

1. Lever Handle: For quarter-turn valves NPS 6 and smaller, except plug valves.

F. Extended Valve Stems: On insulated valves.

2.3 COPPER-ALLOY BALL VALVES

A. Manufacturers:

1. Two-Piece, Copper-Alloy Ball Valves:

- a. Conbraco Industries, Inc.; Apollo Div.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Div.
- e. Grinnell Corporation.
- f. Hammond Valve.
- g. Jamesbury, Inc.
- h. Jomar International, LTD.
- i. Kitz Corporation of America.
- j. Legend Valve & Fitting, Inc.
- k. Milwaukee Valve Company.
- l. NIBCO INC.
- m. Red-White Valve Corp.
- n. Watts Industries, Inc.; Water Products Div.

B. Copper-Alloy Ball Valves, General: MSS SP-110.

C. Two-Piece, Copper-Alloy Ball Valves: Brass or bronze body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig minimum CWP rating and blowout-proof stem.

2.4 BRONZE CHECK VALVES

A. Manufacturers:

1. Type 4, Bronze, Swing Check Valves with Nonmetallic Disc:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Div.
- d. Grinnell Corporation.
- e. Hammond Valve.
- f. McWane, Inc.; Kennedy Valve Div.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Red-White Valve Corp.
- j. Watts Industries, Inc.; Water Products Div.

B. Bronze Check Valves, General: MSS SP-80.

- C. Type 4, Class 125, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Domestic Water Piping: Use the following types of valves:
 - 1. Ball Valves, NPS 2 and Smaller: Two-piece, 400-psig CWP rating, copper alloy.
- D. Heating Water Piping: Use the following types of valves:
 - 1. Ball Valves, NPS 2 and Smaller: Two-piece, 400-psig CWP rating, copper alloy.
- E. Select valves, except wafer and flangeless types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Solder-joint or threaded ends.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 15110

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SECTION 15126
METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Thermometers.
- 2. Gages.
- 3. Test plugs.

B. Related Sections:

- 1. Division 15 Section "Domestic Water Piping" for domestic and fire-protection water service meters inside the building.

1.3 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include performance curves.
- B. Product Certificates: For each type of thermometer and gage, signed by product manufacturer.

PART 2 - PRODUCTS

2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Palmer – Wahl Instruments, Inc.
 - 2. Trerice, H.O. Co.
 - 3. Weiss Instruments, Inc.
 - 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Case: Die-cast aluminum or brass, 7 inches long.
- C. Tube: Red or blue reading, organic-liquid filled, with magnifying lens.
- D. Tube Background: Satin-faced, nonreflective aluminum with permanently etched scale markings.
- E. Window: Glass.
- F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
- G. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
- H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.2 THERMOWELLS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AMETEK, Inc.; U.S. Gauge Div.
 - 2. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 - 3. Ernst Gage Co.
 - 4. Marsh Bellofram.
 - 5. Trerice, H. O. Co.
 - 6. Weiss Instruments, Inc.
 - 7. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Manufacturers: Same as manufacturer of thermometer being used.
- C. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.3 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 2. Ernst Gage Co.
 3. Eugene Ernst Products Co.
 4. Marsh Bellofram.
 5. Trerice, H. O. Co.
 6. Weiss Instruments, Inc.
 7. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
1. Case: Liquid-filled type, drawn steel or cast aluminum, 4-1/2-inch diameter.
 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
 3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
 4. Movement: Mechanical, with link to pressure element and connection to pointer.
 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
 6. Pointer: Red or other dark-color metal.
 7. Window: Glass.
 8. Ring: Metal.
 9. Accuracy: Grade A, plus or minus 1 percent of middle half scale.
 10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
 11. Range for Fluids under Pressure: Two times operating pressure.
- C. Pressure-Gage Fittings:
1. Valves: NPS 1/4 brass or stainless steel needle type.
 2. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.4 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flow Design, Inc.
 2. MG Piping Products Co.
 3. National Meter, Inc.
 4. Peterson Equipment Co., Inc.
 5. Trerice, H. O. Co.
 6. Watts Industries, Inc.; Water Products Div.
- B. Description: Corrosion-resistant brass or stainless steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.

- C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- D. Core Inserts: One or two self-sealing rubber valves.
 - 1. Insert material for water service at 20 to 200 deg F shall be CR.
 - 2. Insert material for water service at minus 30 to plus 275 deg F shall be EPDM.

PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass thermometers in the outlet of each domestic, hot water storage tank.
- B. Provide the following temperature ranges for thermometers:
 - 1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions.
 - 2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions.

3.2 GAGE APPLICATIONS

- A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve.
- B. Install liquid-filled-case-type pressure gages at suction and discharge of each pump.

3.3 INSTALLATIONS

- A. Install direct-mounting thermometers and adjust vertical and tilted positions.
- B. Install thermowells with socket extending to center of pipe and in vertical position in piping tees where thermometers are indicated.
- C. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- D. Install needle valve and snubber fitting in piping for each pressure gage.
- E. Install test plugs in tees in piping.
- F. Install thermometers and gages adjacent to machines and equipment to allow service and maintenance for thermometers, gages, machines, and equipment.
- G. Adjust faces of thermometers and gages to proper angle for best visibility.

END OF SECTION 15126

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SECTION 15140 DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes domestic water piping inside the building.
- B. Related Sections include the following:
 - 1. Division 15 Section "Meters and Gages" for thermometers, pressure gages, and fittings.
 - 2. Division 15 Section "Plumbing Specialties" for water distribution piping specialties.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing domestic water piping systems with 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

- A. Water Samples: Specified in Part 3 "Cleaning" Article.
- B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.2 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Types K and L, water tube, annealed temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- B. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
 - 4. Copper, Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 584 bronze castings.
 - a. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.

2.3 VALVES

- A. Bronze and cast-iron, general-duty valves are specified in Division 15 Section "Valves."
- B. Balancing and drain valves are specified in Division 15 Section "Plumbing Specialties."

PART 3 - EXECUTION

3.1 EXCAVATION

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

3.2 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Aboveground Domestic Water Piping: Use any of the following piping materials for each size range:
 - 1. NPS 6 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 2. NPS 2-1/2 and larger: Hard copper tube, Type L with grooved ends; copper grooved-end fittings; grooved-end-tube couplings; and grooved joints.

3.3 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use bronze ball valves for piping NPS 2 and smaller.
 - 2. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.
 - 3. Drain Duty: Hose-end drain valves.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 - 1. Install hose-end drain valves at low points in water mains, risers, and branches.
 - 2. Install stop-and-waste drain valves where indicated.
- D. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Division 15 Section "Plumbing Specialties."

3.4 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Pressure gages are specified in Division 15 Section "Meters and Gages," and drain valves and strainers are specified in Division 15 Section "Plumbing Specialties."
- D. Install domestic water piping level without pitch and plumb.

3.5 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hanger and support devices are specified in Division 15 Section "Hangers and Supports."
- B. Install supports according to Division 15 Section "Hangers and Supports."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 6: 10 feet with 5/8-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.
- G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.

- C. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
 - 1. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section "Plumbing Fixtures."
 - 3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test domestic water piping as follows:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.9 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Adjust calibrated balancing valves to flows indicated.
4. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 15140

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SECTION 15145
DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following domestic water piping specialties:

1. Vacuum breakers.
2. Backflow preventers.
3. Balancing valves.
4. Temperature-actuated water mixing valves.
5. Strainers.
6. Outlet boxes.
7. Drain valves.
8. Water hammer arresters.
9. Air vents.
10. Trap-seal primer valves.

- B. Related Sections include the following:

1. Division 15 Section "Meters and Gages" for thermometers, pressure gages, and flow meters in domestic water piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. NSF Compliance:

1. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. FEBCO; SPX Valves & Controls.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1001.
3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Chrome plated.

B. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Legend Valve.
 - c. MIFAB, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Woodford Manufacturing Company.
 - f. Zurn Plumbing Products Group; Light Commercial Operation.
 - g. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Chrome or nickel-plated.

C. Pressure Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. FEBCO; SPX Valves & Controls.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1020.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
5. Size: Refer to drawing.
6. Accessories:
 - a. Valves: Ball type, on inlet and outlet.

2.2 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. FEBCO; SPX Valves & Controls.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
5. Size: Refer to drawing.
6. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved or stainless steel for NPS 2-1/2 and larger.
7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
8. Configuration: Designed for horizontal, straight through or vertical flow.
9. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

B. Beverage-Dispensing-Equipment Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1022.
3. Operation: Continuous-pressure applications.
4. Size: NPS 1/4 or NPS 3/8.
5. Body: Stainless steel.
6. End Connections: Threaded.

C. Carbonated-Beverage-Dispenser, Dual-Check-Valve Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1032.
3. Operation: Continuous-pressure applications.
4. Inlet Size: NPS 1/4 or NPS 3/8.
5. Body: Stainless steel.
6. End Connections: Threaded.

D. Hose-Connection Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Woodford Manufacturing Company.
2. Standard: ASSE 1052.
3. Operation: Up to 10-foot head of water back pressure.
4. Inlet Size: NPS 1/2 or NPS 3/4.
5. Outlet Size: Garden-hose thread complying with ASME B1.20.7.
6. Capacity: At least 3-gpm flow.

2.3 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

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

- a. ITT Industries; Bell & Gossett Div.
 - b. NIBCO INC.
 - c. TAC Americas.
 - d. Watts Industries, Inc.; Water Products Div.
2. Type: Ball or Y-pattern globe valve with two readout ports and memory setting indicator.
 3. Body: Brass or bronze,
 4. Size: Same as connected piping, but not larger than NPS 2.

2.4 TEMPERATURE-ACTUATED WATER MIXING VALVES

A. Individual-Fixture, Water Tempering Valves (MV-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Lawler Manufacturing Company, Inc.
 - c. Leonard Valve Company.
 - d. Powers; a Watts Industries Co.
 - e. Watts Industries, Inc.; Water Products Div.
 - f. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1016, thermostatically controlled water tempering valve.
3. Pressure Rating: 125 psig minimum, unless otherwise indicated.
4. Body: Bronze body with corrosion-resistant interior components.
5. Temperature Control: Adjustable.
6. Inlets and Outlet: Threaded.
7. Finish: Rough or chrome-plated bronze.
8. Tempered-Water Setting: 90 deg F.
9. Tempered-Water Design Flow Rate: 0.5 gpm.

B. Manifold, Thermostatic, Water-Mixing-Valve Assemblies (MV-2):

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Lawler Manufacturing Co., Inc. Model No. 805 or a comparable product by one of the following:
 - a. Leonard Valve Company.
 - b. Powers; a Watts Industries Co.
 - c. Symmons Industries, Inc.
2. Description: Factory-fabricated, exposed-mounting, thermostatically controlled, water-mixing-valve assembly in three-valve parallel arrangement.
3. Large-Flow Parallel: Thermostatic water mixing valve and downstream pressure regulator with pressure gages on inlet and outlet.
4. Intermediate-Flow Parallel: Thermostatic water mixing valve and downstream pressure regulator with pressure gages on inlet and outlet.
5. Small-Flow Parallel: Thermostatic water mixing valve.

6. Thermostatic Mixing Valves: Comply with ASSE 1017. Include check stops on hot- and cold-water inlets and shutoff valve on outlet.
7. Water Regulator(s): Comply with ASSE 1003. Include pressure gage on inlet and outlet.
8. Component Pressure Ratings: 125 psig minimum, unless otherwise indicated.
9. Tempered-Water Setting: 110 deg F.
10. Unit Tempered-Water Design Flow Rate: 96 gpm.
11. Unit Minimum Tempered-Water Design Flow Rate: 10 gpm.
12. Selected Unit Flow Rate at 45-psig Pressure Drop: 200 gpm.
13. Unit Pressure Drop at Design Flow Rate: 10 psig.
14. Unit Tempered-Water Outlet Size: 3 NPS end connection.
15. Unit Hot- and Cold-Water Inlet Size: 3 NPS end connections.
16. Thermostatic Mixing Valve and Water Regulator Finish: Rough bronze.
17. Piping Finish: Copper.

2.5 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.020 inch.
 - b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch.
 - c. Strainers NPS 5 and Larger: 0.10 inch.
6. Drain: Factory-installed, hose-end drain valve.

2.6 OUTLET BOXES

A. Outlet Boxes (OB-1 and OB-2):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company.
 - b. IPS Corporation.
 - c. LSP Products Group, Inc.
 - d. Oatey.
2. Mounting: Recessed or wall mounted (See Drawings).
3. Material and Finish: Enameled-steel or epoxy-painted-steel box and faceplate.
4. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
5. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

2.7 HOSE BIBBS

A. Hose Bibbs (HB-1):

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel-plated.
9. Finish for Service Areas: Chrome or nickel-plated.
10. Finish for Finished Rooms: Chrome or nickel-plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.8 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.9 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company.
 - b. MIFAB, Inc.
 - c. PPP Inc.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - f. Tyler Pipe; Wade Div.

- g. Watts Drainage Products Inc.
 - h. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
 3. Type: Metal bellows.
 4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.10 AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

B. Welded-Construction Automatic Air Vents:

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.11 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MIFAB, Inc.
 - b. PPP Inc.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers in same room as connected equipment or system.
 - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- C. Install water control valves with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- D. Install balancing valves in locations where they can easily be adjusted.
- E. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 - 1. Install thermometers and water regulators if specified.
 - 2. Install cabinet-type units recessed in or surface mounted on wall as specified.
- F. Install Y-pattern strainers for water on supply side of each control valve, water pressure-reducing valve, and pump.
- G. Install outlet boxes recessed in wall or mounted to wall surface.
- H. Install water hammer arresters in water piping according to PDI-WH 201.
- I. Install air vents at high points of water piping.
- J. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping and specialties.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Pressure vacuum breakers.
 - 2. Reduced-pressure-principle backflow preventers.
 - 3. Carbonated-beverage-machine backflow preventers.
 - 4. Calibrated balancing valves.
 - 5. Manifold, thermostatic, water-mixing-valve assemblies.
 - 6. Outlet boxes.
 - 7. Supply-type, trap-seal primer valves.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 15 Section "Mechanical Identification."

3.4 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION 15145

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SECTION 15150
SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following for soil, waste, and vent piping inside the building:
 - 1. Pipe, tube, and fittings.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) ANACO.
 - 2) Fernco, Inc.
 - 3) Ideal Div.; Stant Corp.
 - 4) Mission Rubber Co.
 - 5) Tyler Pipe; Soil Pipe Div.

2.4 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
 - 1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

2.5 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
 - 1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless steel couplings; and hubless-coupling joints.
 - 2. Copper DWV tube, copper drainage fittings, and soldered joints.
- C. Aboveground, vent piping NPS 4 and smaller shall be any following:
 - 1. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless steel couplings; and hubless-coupling joints.
- D. Underground, soil, waste, and vent piping NPS 3 and larger shall be the following:
 - 1. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.3 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building is specified in Division 2 Section "Sanitary Sewerage."
- B. Basic piping installation requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- D. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- E. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

- F. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- G. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 2; 1 percent downward in direction of flow for piping NPS 3 and larger.
 - 2. Horizontal Sanitary Drainage Piping: 1 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- H. Install engineered soil and waste drainage and vent piping systems as follows:
 - 1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
- I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- J. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- K. Install underground PVC soil and waste drainage piping according to ASTM D 2321.
- L. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- D. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 15 Section "Valves."
- B. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 15 Section "Hangers and Supports." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if indicated: MSS Type 49, spring cushion rolls.
- B. Install supports according to Division 15 Section "Hangers and Supports."
- C. Support vertical piping and tubing at base and at floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 - 4. NPS 6: 60 inches with 3/4-inch rod.
 - 5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
- F. Install supports for vertical cast-iron soil piping every 15 feet.
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - 5. NPS 6: 10 feet with 5/8-inch rod.
 - 6. NPS 8: 10 feet with 3/4-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.
- I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.8 PROTECTION

- A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION 15150

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SECTION 15155
DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following drainage piping specialties:
 - 1. Cleanouts.
 - 2. Floor drains.
 - 3. Miscellaneous drainage piping specialties.
 - 4. Grease interceptors.

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
 - 1. Grease interceptors.
- B. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary and storm piping specialty components.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Metal Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation
2. Standard: ASME A112.36.2M for adjustable housing cast-iron soil pipe with cast-iron ferrule heavy-duty, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Heavy-duty, adjustable housing.
5. Clamping Device: Not required.
6. Outlet Connection: Threaded.
7. Closure: Brass plug with tapered threads.
8. Adjustable Housing Material: Cast iron with threads.
9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
10. Frame and Cover Shape: Round.
11. Top Loading Classification: Medium Duty.
12. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

2.2 FLOOR DRAINS

A. Floor Drains (FD-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Light Commercial Operation.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.

6. Anchor Flange: Not required.
7. Clamping Device: Not required.
8. Outlet: Bottom.
9. Coating on Interior and Exposed Exterior Surfaces: Not required.
10. Sediment Bucket: Not required.
11. Top or Strainer Material: Nickel bronze.
12. Top of Body and Strainer Finish: Nickel bronze.
13. Top Shape: Square.
14. Dimensions of Top or Strainer: 6" by 6" square adjustable strainer with square openings and 3" outlet.
15. Top Loading Classification: Medium Duty.
16. Funnel: Not required.
17. Inlet Fitting: Not required.
18. Trap Material: Cast iron.
19. Trap Pattern: Deep-seal P-trap.
20. Trap Features: Trap-seal primer valve drain connection.

2.3 FLOOR SINKS

A. Floor Sinks (FS-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Light Commercial Operation.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Anchor Flange: Not required.
7. Clamping Device: Not required.
8. Outlet: Bottom.
9. Coating on Interior and Exposed Exterior Surfaces: Required.
10. Sediment Bucket: Not required.
11. Top or Strainer Material: Nickel bronze.
12. Top of Body and Strainer Finish: Nickel bronze.
13. Top Shape: Round.
14. Dimensions of Top or Strainer: 8" diameter x 6" deep body.
15. Top Loading Classification: Medium Duty.
16. Funnel: Not required.
17. Inlet Fitting: Not required.
18. Trap Material: Cast iron.
19. Trap Pattern: Deep-seal P-trap.

2.4 MISCELLANEOUS DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
 - a. NPS 2: 4-inch- minimum water seal.
 - b. NPS 2-1/2 and Larger: 5-inch- minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

2.5 GREASE INTERCEPTORS

A. Grease Interceptors (GI-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Light Commercial Operation.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.14.3 and PDI-G101, for intercepting and retaining fats, oils, and greases from food-preparation wastewater.
3. Plumbing and Drainage Institute Seal: Not required.
4. Body Material: Cast iron or steel.
5. Interior Lining: Corrosion-resistant enamel.
6. Exterior Coating: Corrosion-resistant enamel.
7. Body Dimensions: 33" x 18"
8. Body Extension: Required.
9. Flow Rate: 25 gph.
10. Grease Retention Capacity: 50 lbs.

11. Inlet and Outlet Size: 3-inches.
12. End Connections: Threaded.
13. Cleanout: Integral.
14. Mounting: Fully-recessed in floor.
15. Flow-Control Fitting: Required.
16. Operation: Manual cleaning.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 1. Position floor drains for easy access and maintenance.
 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- F. Install deep-seal traps on floor drains and other waste outlets, if indicated.

- G. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.
- H. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- I. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Grease Interceptors: Connect inlet and outlet to unit, and connect flow-control fitting and vent to unit inlet piping.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Grease interceptors.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 15 Section "Mechanical Identification."

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 15155

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Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 15410
PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories and sinks.
2. Laminar-flow faucet-spout outlets.
3. Protective shielding guards.
4. Fixture supports.
5. Hot-water dispensers.
6. Lavatories.
7. Commercial sinks.
8. Service sinks.

- B. Related Sections include the following:

1. Division 15 Section "Plumbing Specialties" for backflow preventers, floor drains, and specialty fixtures not included in this Section.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.

- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PVC: Polyvinyl chloride plastic.
- H. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
1. Plastic Mop-Service Basins: ANSI Z124.6.
 2. Stainless-Steel Commercial Sinks: NSF 2 construction.
 3. Vitreous-China Fixtures: ASME A112.19.2M.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
1. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
 2. Faucets: ASME A112.18.1.
 3. Hose-Connection Vacuum Breakers: ASSE 1011.
 4. Hose-Coupling Threads: ASME B1.20.7.
 5. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 6. NSF Potable-Water Materials: NSF 61.
 7. Pipe Threads: ASME B1.20.1.
 8. Supply Fittings: ASME A112.18.1.
 9. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
1. Atmospheric Vacuum Breakers: ASSE 1001.
 2. Brass and Copper Supplies: ASME A112.18.1.
 3. Brass Waste Fittings: ASME A112.18.2.
- J. Comply with the following applicable standards and other requirements specified for miscellaneous components:
1. Floor Drains: ASME A112.6.3.
 2. Hose-Coupling Threads: ASME B1.20.7.
 3. Hot-Water Dispensers: ASSE 1023 and UL 499.
 4. Off-Floor Fixture Supports: ASME A112.6.1M.
 5. Pipe Threads: ASME B1.20.1.
 6. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.
 3. Provide hinged-top metal box, or individual metal boxes, with separate compartments for each type and size of extra materials listed above.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS

A. Lavatory Faucets, Type 1:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Chicago Faucet Model No. 2200-4E2805CP or a comparable product by one of the following:
 - a. American Standard Companies, Inc.
 - b. Chicago Faucets.
 - c. Delta Faucet Company.
 - d. Eljer.
 - e. Kohler Co.
 - f. Speakman Company.
 - g. T & S Brass and Bronze Works, Inc.
 - h. Zurn Plumbing Products Group; Commercial Brass Operation.
2. Description: Single-control mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
3. Body Material: Commercial, solid brass.
4. Finish: Polished chrome plate.
5. Maximum Flow Rate: 0.5 gpm.
6. Centers: 4 inches.
7. Mounting: Deck, exposed.
8. Valve Handle(s): Lever.
9. Inlets: NPS 3/8 tubing, plain end.
10. Spout: Rigid type.
11. Spout Outlet: Vandal resistant aerator.
12. Operation: Non-compression, manual.
13. Drain: Grid
14. Tempering Device: Required, (MV-1).

2.2 SINK FAUCETS

A. Sink Faucet, Type 2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Chicago Faucet Model No. 897-HC-CP or a comparable product by one of the following:
 - a. Chicago Faucet Co.
 - b. Cambridge Brass; Div. Of Masco Corp.
 - c. Delta Faucet Co.; Div. Of Masco Corp.
 - d. T & S Brass and Bronze Works, Inc.
2. Maximum Flow Rate: 2.5 gpm, unless otherwise indicated.
3. Body Material: Cast brass.
4. Finish: Polished chrome plate.

5. Type: Service sink faucet with internal checks.
6. Mixing Valve: Two-lever handle.
7. Centers: 8-inches, adjustable.
8. Mounting: Wall, exposed.
9. Handle[s]: Lever.
10. Inlet[s]: NPS 1/2 female union nut.
11. Spout: Rigid.
12. Spout Outlet: NPS 3/4 male hose thread.
13. Vacuum Breaker: Required.
14. Operation: Non-compression, manual.
15. Drain: Not required.
16. Tempering Device: Not required.

B. Sink Faucet, Type 1:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Chicago Faucet Model No. 445-L12CP or a comparable product by one of the following:
 - a. Cambridge Brass; Div. Of Masco Corp.
 - b. Chicago Faucet Co.
 - c. Delta Faucet Co.; Div. Of Masco Corp.
 - d. T & S Brass and Bronze Works, Inc.
2. Maximum Flow Rate: 2.5 gpm, unless otherwise indicated.
3. Body Material: Cast brass.
4. Finish: Polished chrome plate.
5. Type: Scullery Sink Faucet.
6. Mixing Valve: Two-lever handle.
7. Centers: Adjustable.
8. Mounting: Back/Wall, exposed.
9. Handle[s]: Lever.
10. Inlet[s]: NPS 1/2 female shank.
11. Spout: 12".
12. Spout Outlet: Vandal resistant laminar flow outlet.
13. Vacuum Breaker: Not Required.
14. Operation: Non-compression, manual.
15. Drain: Not required.
16. Tempering Device: Not required.

2.3 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Enclosures:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. PLUMBEREX.
 - b. TRUEBRO, Inc.

2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

2.4 FIXTURE SUPPORTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Josam Company.
 2. MIFAB Manufacturing Inc.
 3. Smith, Jay R. Mfg. Co.
 4. Tyler Pipe; Wade Div.
 5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
 6. Zurn Plumbing Products Group; Specification Drainage Operation.
- B. Lavatory Supports:
 1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.
 2. Accessible-Fixture Support: Include rectangular steel uprights.

2.5 HOT-WATER DISPENSERS

- A. Hot-Water Dispensers, Type 1:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkay Manufacturing Co.
 - b. In-Sink-Erator; a div. of Emerson Electric Co.
 - c. Just Manufacturing Company.
 - d. KitchenAid.
 2. Description: Gooseneck spout with lever-handle or push button flow control, household-type dispenser with instant on-off control; insulated, corrosion-resistant-metal storage tank that is open to atmosphere; electric heating element; chrome-plated faucet or spout; removable strainer; thermostat control for water temperature up to 190 deg F; and thermal-overload protection.
 - a. Storage Tank Capacity: 0.5 gal.
 - b. Heating Element: 750 W minimum, 115-V ac.

2.6 LAVATORIES

- A. Lavatories, (L-1):
 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings American Standard Lucerne Model 0356.421 or a comparable product by one of the following:

- a. American Standard Companies, Inc.
 - b. Crane Plumbing, L.L.C./Fiat Products.
 - c. Eljer.
 - d. Kohler Co.
2. Description: Accessible, wall-mounting, vitreous-china fixture.
- a. Type: Ledge back.
 - b. Size: 20 by 18 inches rectangular.
 - c. Faucet Hole Punching: 4" centers.
 - d. Faucet Hole Location: Deck.
 - e. Pedestal: Not required.
 - f. Color: White.
 - g. Rim Height: 34-inches.
 - h. Faucet: Lavatory Type 1.
 - i. Supplies: NPS 3/8 chrome-plated copper with stops.
 - j. Drain: Grid.
 - k. Drain Piping: NPS 1-1/4 by NPS 1-1/2 chrome-plated, cast-brass P-trap; NPS 1-1/2, 0.045-inch- thick tubular brass waste to wall; and wall escutcheon.
 - l. Protective Shielding Guards: Required.
 - m. Fixture Support: Lavatory.

2.7 SINKS

A. Sink (S-1):

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Elkay Weldbilt Triple Compartment Scullery Sink Model No. WNSF8354.
 - a. Elkay Manufacturing Co.
 - b. Just Manufacturing Company.
- 2. Description: Three compartment, freestanding, stainless-steel commercial sink with backsplash.
 - a. Overall Dimensions: 57 by 27-1/2 by 14 inches deep.
 - b. Metal Thickness: 14 gauge.
 - c. Each Compartment: 18 by 27-1/2 by 14 inches deep.
 - d. Drains: Grid with NPS 1-1/2 tailpiece and twist drain.
 - 1) Location: Centered in compartment.
 - e. Drainboards: Not required.
 - f. Supports: Adjustable-length, steel legs.
 - g. Faucets: Sink Type 1.
 - h. Mounting: Wall, centered on second compartment.
 - i. Supplies: NPS 3/4 chrome plated copper with stops or shutoff valves.
 - j. Drain Piping: NPS 2 DWV copper trap waste to FS-1, open site.

2.8 SERVICE SINKS

A. Service Sinks, (SS-1):

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Fiat Model No. MSB-2424 or a comparable product by one of the following:
 - a. Fiat
 - b. Crane Plumbing/Fiat Products.
 - c. Mustee, E. L. & Sons, Inc.
 - d. Stern Williams Co.
2. Shape: Square.
3. Size: 24 by 24 inches.
4. Height: 12 inches with dropped front.
5. Tiling Flange: Not required.
6. Rim Guard: Not required.
7. Color: Not applicable.
8. Faucet: Sink Type 2.
9. Drain: Grid with NPS 3 outlet.
10. Accessories: Mop bracket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.

- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install fixtures level and plumb according to roughing-in drawings.
- G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 15 Section "Valves."
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- K. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- L. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- M. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- N. Install hot-water dispensers in back top surface of sink or in countertop.
- O. Install escutcheons at piping wall or ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- P. Set mop basins in leveling bed of cement grout. Grout is specified in Division 15 Section "Basic Mechanical Materials and Methods."
- Q. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 7 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 16 Section "Grounding and Bonding."
- D. Connect wiring according to Division 16 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 15410

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Troy School District
Troy, Michigan

SECTION 15767
PROPELLER UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes propeller unit heaters with electric-resistance heating coils.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each unit type and configuration.
- B. Operation and Maintenance Data: For propeller unit heaters to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Berko
 - 2. Indeco
 - 3. QMark
 - 4. Trane

2.2 UNIT HEATERS

- A. Description: An assembly including casing, coil, fan, and motor in horizontal discharge configuration with adjustable discharge louvers.

2.3 CASING

- A. Cabinet: Removable panels for maintenance access to controls.
- B. Cabinet Finish: Manufacturer's standard baked enamel applied to factory-assembled and -tested propeller unit heater before shipping.
- C. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.

2.4 COILS

- A. Electric-Resistance Heating Elements: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch. Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg. F. at any point during normal operation.
 - 1. Circuit Protection: One-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
 - 2. Wiring Terminations: Stainless-steel or corrosion-resistant material.

2.5 FAN

- A. Propeller type, aluminum wheel directly mounted on motor shaft in the fan venturi.

2.6 FAN MOTORS

- A. Comply with requirements in Division 15 Section "Motors."
- B. Motor Type: Permanently lubricated.

2.7 CONTROL DEVICES

- A. Unit-mounted thermostat.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive propeller unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for electrical connections to verify actual locations before propeller unit-heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install propeller unit heaters level and plumb.
- B. Install propeller unit heaters to comply with NFPA 90A and manufacturer's written installation instructions.
- C. Suspend propeller unit heaters from structure with all-thread hanger rods, field fabricated steel support frame or unit manufacturer's support frame. Hanger rods and attachments to structure are specified in Division 15 Section "Hangers and Supports."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Ground equipment according to Division 16 Section "Grounding and Bonding."
- C. Connect wiring according to Division 16 Section "Conductors and Cables."

END OF SECTION 15767

SECTION 16051
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Electrical equipment coordination and installation.
 - 2. Sleeves for raceways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common electrical installation requirements.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.

4. So connecting raceways, cables, wireways and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems".

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 3. Pressure Plates: Plastic. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 7 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION 16051

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16060
GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Grounding arrangements and connections for separately derived systems.
 - 2. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Stranded copper.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- C. Water Heater Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- C. Grounding and Bonding for Piping:
 - 1. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 2. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

- D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install **tinned** bonding jumper to bond across flexible duct connections to achieve continuity.
- E. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- B. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
- C. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 - 2. Pad-Mounted Equipment: 5 ohms.
- D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 16060

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16073
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 DEFINITIONS

- A. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Nonmetallic slotted channel systems. Include Product Data for components.
 - 4. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 7 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Fabco Plastics Wholesale Limited.
 - d. Seasafe, Inc.
 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 3. Fitting and Accessory Materials: Same as channels and angles.
 4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 9 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 16073

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16075
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Identification for raceway.
 - 2. Identification for conductors and communication and control cable.
 - 3. Underground-line warning tape.
 - 4. Warning labels and signs.
 - 5. Instruction signs.
 - 6. Equipment identification labels.
 - 7. Miscellaneous identification products.

1.3 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
- C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
 - 1. Power Circuits: Black letters on an orange field.
 - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

2.3 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

- 1. Minimum Width: 3/16 inch.
- 2. Tensile Strength: 50 lb, minimum.
- 3. Temperature Range: Minus 40 to plus 185 deg F.
- 4. Color: Black, except where used for color-coding.

- B. Paint: Paint materials and application requirements are specified in Division 9 painting Sections.

- 1. Exterior Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):

- a. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.

- 1) Primer: Exterior concrete and masonry primer.
- 2) Finish Coats: Exterior semigloss acrylic enamel.

- 2. Exterior Concrete Unit Masonry:

- a. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.

- 1) Block Filler: Concrete unit masonry block filler.
- 2) Finish Coats: Exterior semigloss acrylic enamel.

- 3. Exterior Ferrous Metal:

- a. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

- 1) Primer: Exterior ferrous-metal primer.
- 2) Finish Coats: Exterior semigloss alkyd enamel.

- 4. Exterior Zinc-Coated Metal (except Raceways):

- a. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

- 1) Primer: Exterior zinc-coated metal primer.
- 2) Finish Coats: Exterior semigloss alkyd enamel.

- 5. Interior Concrete and Masonry (Other Than Concrete Unit Masonry):

- a. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

- 1) Primer: Interior concrete and masonry primer.
- 2) Finish Coats: Interior semigloss alkyd enamel.

6. Interior Concrete Unit Masonry:
 - a. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
 - 1) Block Filler: Concrete unit masonry block filler.
 - 2) Finish Coats: Interior semigloss acrylic enamel.
 7. Interior Gypsum Board:
 - a. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - 1) Primer: Interior gypsum board primer.
 - 2) Finish Coats: Interior semigloss acrylic enamel.
 8. Interior Ferrous Metal:
 - a. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - 1) Primer: Interior ferrous-metal primer.
 - 2) Finish Coats: Interior semigloss acrylic enamel.
 9. Interior Zinc-Coated Metal (except Raceways):
 - a. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - 1) Primer: Interior zinc-coated metal primer.
 - 2) Finish Coats: Interior semigloss acrylic enamel.
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Accessible Raceways, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label.
- B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:
 1. Mechanical and Electrical Supervisory System: Green and blue.
 2. Telecommunication System: Green and yellow.
 3. Control Wiring: Green and red.
- C. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in pull and junction boxes, manholes, and handholes use metal tags. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

- D. **Branch-Circuit Conductor Identification:** Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
- E. **Conductors to Be Extended in the Future:** Attach write-on tags to conductors and list source and circuit number.
- F. **Auxiliary Electrical Systems Conductor Identification:** Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- G. **Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting:** Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
 - 1. **Equipment with Multiple Power or Control Sources:** Apply to door or cover of equipment including, but not limited to, the following:
 - a. Controls with external control power connections.
 - 2. **Equipment Requiring Workspace Clearance According to NFPA 70:** Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- H. **Equipment Identification Labels:** On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. **Labeling Instructions:**
 - a. **Indoor Equipment:** Engraved, laminated acrylic or melamine label.
 - b. **Elevated Components:** Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - 2. **Equipment to Be Labeled:**
 - a. Panelboards, electrical cabinets, and enclosures.
 - b. Access doors and panels for concealed electrical items.
 - c. Push-button stations.
 - d. Contactors.
 - e. Remote-controlled switches and control devices.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- H. Painted Identification: Prepare surface and apply paint according to Division 9 painting Sections.

END OF SECTION 16075

SECTION 16120
CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Alcan Products Corporation; Alcan Cable Division.
 2. American Insulated Wire Corp.; a Leviton Company.
 3. General Cable Corporation.
 4. Senator Wire & Cable Company.
 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, XHHW, UF, USE and SO.
- D. Multiconductor Cable: Comply with NEMA WC 70 for nonmetallic-sheathed cable, Type NM; Type SO with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. AFC Cable Systems, Inc.
 2. Hubbell Power Systems, Inc.
 3. O-Z/Gedney; EGS Electrical Group LLC.
 4. 3M; Electrical Products Division.
 5. Tyco Electronics Corp.

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Stranded copper.
- B. Branch Circuits: Stranded copper.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- F. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- G. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- H. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

- E. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 7 Section "Through-Penetration Firestop Systems."

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16130
RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. FMC: Flexible metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Custom enclosures and cabinets.
 - 2. For handholes and boxes for underground wiring, including the following:
 - a. Duct entry provisions, including locations and duct sizes.
 - b. Frame and cover design.
 - c. Grounding details.

- d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
 - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
- 1. Structural members in the paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
- D. Qualification Data: For professional engineer and testing agency.
- E. Source quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. O-Z Gedney; a unit of General Signal.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 2. Fittings for EMT: Steel type.
- G. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper B-Line, Inc.
 2. Hoffman.
 3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type.
- E. Finish: Manufacturer's standard enamel finish.

2.3 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Thomas & Betts Corporation.
 - b. Walker Systems, Inc.; Wiremold Company (The).
 - c. Wiremold Company (The); Electrical Sales Division.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 2. EGS/Appleton Electric.
 3. Hoffman.
 4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 5. RACO; a Hubbell Company.
 6. Spring City Electrical Manufacturing Company.

7. Thomas & Betts Corporation.
 8. Walker Systems, Inc.; Wiremold Company (The).
 9. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- H. Cabinets:
1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Comply with the following indoor applications, unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: Rigid steel conduit.

7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- B. Minimum Raceway Size: 1/2-inch trade size.
 - C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
 - D. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- G. Raceways Embedded in Slabs:
 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- L. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- M. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- N. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Division 2 Section "Earthwork."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."
 - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
 - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 16130

Kingscott Associates, Inc.
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Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16140 WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Twist-locking receptacles.
 - 3. Snap switches.
 - 4. Pendant cord-connector devices.
 - 5. Cord and plug sets.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
 - 1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 5351 (single), 5352 (duplex).
 - b. Hubbell; HBL5351 (single), CR5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; GF20.
 - b. Pass & Seymour; 2084.
 - c. Leviton.
 - d. Hubbell.

2.4 HAZARDOUS (CLASSIFIED) LOCATION RECEPTACLES

A. Wiring Devices for Hazardous (Classified) Locations: Comply with NEMA FB 11 and UL 1010.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Crouse-Hinds.
 - b. EGS/Appleton Electric.
 - c. Killark; a division of Hubbell Inc.

2.5 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; L520R.
 - b. Hubbell; HBL2310.
 - c. Leviton; 2310.
 - d. Pass & Seymour; L520-R.

2.6 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.

1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.7 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.8 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
 - b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

C. Pilot Light Switches, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 2221PL for 120 V and 277 V.
 - b. Hubbell; HPL1221PL for 120 V and 277 V.
 - c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.
 - d. Pass & Seymour; PS20AC1-PLR for 120 V.

D. Key-Operated Lighting Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide "real" keyed switches with two (2) keys per switch. All facility keyed switches shall utilize the same keying configuration or comparable product by one of the following:
 - a. Pass & Seymour; #20ACI-KL-4609.
 - b. Leviton #1221-KL
 - c. Cooper #AH1191N
2. Description: Single pole, with factory-supplied key in lieu of switch handle.

2.9 COMMUNICATIONS OUTLETS

A. Telephone Outlet:

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

- a. Cooper; 3560-6.
 - b. Leviton; 40649.
2. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.

2.10 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: Stainless steel.
 3. Material for Unfinished Spaces: Galvanized steel.
 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

2.11 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 IDENTIFICATION

A. Comply with Division 16 Section "Electrical Identification."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

- C. Test straight blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz..

END OF SECTION 16140

SECTION 16145
LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following lighting control devices:
 - 1. Time switches.
- B. Related Sections include the following:
 - 1. Division 16 Section "Wiring Devices" for manual light switches.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For each type of product to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Intermatic, Inc.
 - 2. Leviton Mfg. Company Inc.
 - 3. Lightolier Controls; a Genlyte Company.
 - 4. Lithonia Lighting; Acuity Lighting Group, Inc.
 - 5. Paragon Electric Co.; Invensys Climate Controls.
 - 6. Watt Stopper (The).

- B. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.
 - 1. Contact Configuration: DPST.
 - 2. Contact Rating: 20-A ballast load, 120/240-V ac.
 - 3. Programs: Eight (8) channels; each channel shall be individually programmable with 40 on-off operations per week and an annual holiday schedule that overrides the weekly operation on holidays.
 - 4. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
 - 5. Astronomic Time: All channels.
 - 6. Battery Backup: For schedules and time clock.

2.2 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 16 Section "Conductors and Cables."

- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 16 Section "Conductors and Cables."

- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 16 Section "Conductors and Cables."

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

- A. Wiring Method: Comply with Division 16 Section "Conductors and Cables." Minimum conduit size shall be 1/2 inch.

- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

- C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.2 IDENTIFICATION

- A. Identify components and power and control wiring according to Division 16 Section "Electrical Identification."
- B. Label time switches with a unique designation.

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 - 2. Operational Test: Verify operation of each lighting control device, and adjust time delays.
- B. Lighting control devices that fail tests and inspections are defective work.

3.4 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 16145

SECTION 16410
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.3 DEFINITIONS

- A. GD: General duty.
- B. GFCI: Ground-fault circuit interrupter.
- C. HD: Heavy duty.
- D. RMS: Root mean square.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. UL listing for series rating of installed devices.
 - 4. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- E. Manufacturer's field service report.
- F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures and Operation and Maintenance Data":

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Division.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D/Group Schneider.
- B. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type HD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Nonfusible Switch, 600 A and Smaller: NEMA KS 1, Type HD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- D. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.
 - 3. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

2.3 MOLDED-CASE CIRCUIT BREAKERS AND SWITCHES

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Division.
 - 3. Moeller Electric Corporation.

4. Siemens Energy & Automation, Inc.
 5. Square D/Group Schneider.
- B. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. GFCI Circuit Breakers: Single- and two-pole configurations with [5] [30]-mA trip sensitivity.
- C. Molded-Case Circuit-Breaker Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
 2. Lugs: Mechanical style with compression lug kits suitable for number, size, trip ratings, and conductor material.
 3. Application Listing: Type SWD for switching fluorescent lighting loads; Type HACR for heating and refrigerating equipment.
 4. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.4 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
1. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of circuit breakers.
- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 16 Section "Electrical Identification."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Prepare for acceptance testing as follows:
 - 1. Inspect mechanical and electrical connections.
 - 2. Verify switch and relay type and labeling verification.
 - 3. Verify rating of installed fuses.
 - 4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.
- C. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports.

3.5 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 16410

Kingscott Associates, Inc.
Architects/Engineers
Kalamazoo, Michigan

Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16511 INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior lighting fixtures, lamps, and ballasts.
 - 2. Emergency lighting units.
 - 3. Lighting fixture supports.

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CRI: Color-rendering index.
- C. CU: Coefficient of utilization.
- D. HID: High-intensity discharge.
- E. LER: Luminaire efficacy rating.
- F. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Ballast.

4. Energy-efficiency data.
 5. Life, output, and energy-efficiency data for lamps.
 6. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by the manufacturer.
 - b. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.
1. Wiring Diagrams: Power and control wiring.
- C. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.
- D. Qualification Data: For agencies providing photometric data for lighting fixtures.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
- G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

- A. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.
 - 2. Warranty Period for Electromagnetic Ballasts: Three years from date of Substantial Completion.
- B. Special Warranty for T8 Fluorescent Lamps: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- B. In Interior Lighting Fixture Schedule, the following requirements apply to product selection:
 - 1. Basis-of-Design Product: The design for each lighting fixture is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified as listed on documents.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
- C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.
- D. Metal Parts: Free of burrs and sharp corners and edges.
- E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

H. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
 - b. UV stabilized.
2. Glass: Annealed crystal glass, unless otherwise indicated.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. Electronic Ballasts: Comply with ANSI C82.11; instant-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.

1. Sound Rating: A.
2. Total Harmonic Distortion Rating: Less than 10 percent.
3. Transient Voltage Protection: IEEE C62.41, Category A or better.
4. Operating Frequency: 20 kHz or higher.
5. Lamp Current Crest Factor: 1.7 or less.
6. BF: 0.85 or higher.
7. Power Factor: 0.95 or higher.
8. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C 82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.

B. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.

1. Ballast Manufacturer Certification: Indicated by label.

C. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

D. Ballasts for Low-Temperature Environments:

1. Temperatures 0 Deg F and Higher: Electronic type rated for 0 deg F starting and operating temperature with indicated lamp types.
2. Temperatures Minus 20 Deg F and Higher: Electromagnetic type designed for use with indicated lamp types.

2.4 FLUORESCENT LAMPS

- A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.
- B. T8 rapid-start low-mercury lamps, rated 32 W maximum, nominal length of 48 inches, 2800 initial lumens (minimum), CRI 75 (minimum), color temperature 4100 K, and average rated life 20,000 hours, unless otherwise indicated.

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 16 Section "Electrical Supports" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- C. Connect wiring according to Division 16 Section "Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 16511

Kingscott Associates, Inc.
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Athens High School
Concessions Remodeling
Troy School District
Troy, Michigan

SECTION 16521 EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior luminaires with lamps and ballasts.
 - 2. Luminaire-mounted photoelectric relays.
- B. Related Sections include the following:
 - 1. Division 16 Section "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.3 DEFINITIONS

- A. CRI: Color-rendering index.
- B. HID: High-intensity discharge.
- C. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

- A. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-4.
- B. Live Load: Single load of 500 lbf, distributed as stated in AASHTO LTS-4.
- C. Ice Load: Load of 3 lbf/sq. ft., applied as stated in AASHTO LTS-4.

1.5 SUBMITTALS

- A. **Product Data:** For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
 - 2. Details of attaching luminaires and accessories.
 - 3. Details of installation and construction.
 - 4. Luminaire materials.
 - 5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.
 - a. For indicated luminaires, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
 - b. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - 6. Photoelectric relays.
 - 7. Ballasts, including energy-efficiency data.
 - 8. Lamps, including life, output, and energy-efficiency data.
 - 9. Materials, dimensions, and finishes of poles.
 - 10. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
- B. **Qualification Data:** For agencies providing photometric data for lighting fixtures.
- C. **Field quality-control test reports.**
- D. **Warranty:** Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

- A. **Luminaire Photometric Data Testing Laboratory Qualifications:** Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. **Comply with IEEE C2, "National Electrical Safety Code."**
- D. **Comply with NFPA 70.**

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.
 - 1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
 - 2. Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.
 - 3. Warranty Period for Color Retention: Five years from date of Substantial Completion.
 - 4. Warranty Period for Lamps: Replace lamps and fuses that fail within 12 months from date of Substantial Completion; furnish replacement lamps and fuses that fail within the second 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- B. In Exterior Lighting Schedule, the following requirements apply to product selection:
 - 1. Basis of Design Product: The design of each item of exterior luminaire and its support is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified as listed on documents.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during

relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- M. Factory-Applied Finish for Steel luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As selected by Architect from manufacturer's full range.
- N. Factory-Applied Finish for Aluminum luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 - 2. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

2.3 FLUORESCENT BALLASTS AND LAMPS

- A. Low-Temperature Ballast Capability: Rated by its manufacturer for reliable starting and operation of indicated lamp(s) at temperatures minus 20 deg F and higher.
- B. Ballast Characteristics:
 - 1. Power Factor: 90 percent, minimum.
 - 2. Sound Rating: A.
 - 3. Total Harmonic Distortion Rating: Less than 10 percent.
 - 4. Electromagnetic Ballasts: Comply with ANSI C82.1, energy-saving, high power factor, Class P, automatic-reset thermal protection.
 - 5. Case Temperature for Compact Lamp Ballasts: 65 deg C, maximum.
 - 6. Transient-Voltage Protection: Comply with IEEE C62.41 Category A or better.
- C. Low-Temperature Lamp Capability: Rated for reliable starting and operation with ballast provided at temperatures minus 20 deg F and higher.
- D. Fluorescent Lamps: Low-mercury type. Comply with the EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

2.4 BALLASTS FOR HID LAMPS

- A. Comply with ANSI C82.4 and UL 1029 and capable of open-circuit operation without reduction of average lamp life. Include the following features, unless otherwise indicated:
 - 1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
 - 2. Minimum Starting Temperature: Minus 22 deg F.
 - 3. Normal Ambient Operating Temperature: 104 deg F.
 - 4. Ballast Fuses: One in each ungrounded power supply conductor. Voltage and current ratings as recommended by ballast manufacturer.

2.5 HID LAMPS

- A. Metal-Halide Lamps: ANSI C78.1372, with a minimum CRI 65, and color temperature 4000 K.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Install lamps in each luminaire.
- B. Fasten luminaire to indicated structural supports.
 - 1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

- C. Adjust luminaires that require field adjustment or aiming.

3.2 CORROSION PREVENTION

- A. Steel Conduits: Comply with Division 16 Section "Raceways and Boxes." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
 - 1. Verify operation of photoelectric controls.

END OF SECTION 16521

**TROY SCHOOL DISTRICT
 Bid 9393 Concessions' Remodeling
 Athens High School**

	6.2	15.1	16.1
	<u>General Trades</u>	<u>Mechanical</u>	<u>Electrical</u>
M.L. Schoenherr Const. Inc.	114,800.00		
TDS Contractors, Inc.	118,000.00		
Robert Van Kampen Co.	127,400.00		
Hicks Construction Co., Inc.	134,200.00		
Scheich Commercial Cont. Corp.	146,000.00		
Painting			
G.M. Painting Inc.	2,800.00		
Joseph P. Weber Painting Co.	5,000.00		
Masonry			
Giannola Masonry Co.	66,000.00		
Macomb Mechanical, Inc.		63,800.00	
DeMaster Electric			29,790.00