SCHOOL DISTRICT 308

FREEDOM OF INFORMATION

June 16, 2014

Pat Richards
4979 Indiana Ave.
Lisle, Il 60532
prichards@carpentersunion.org

Re: FOIA Request Received June 9, 2014 FOIA ID #14-23

Subject: The list of bidders for the HVAC renovations at 2290 Barrington Drive, Aurora, IL and whether or not the scope of the work includes carpentry.

Dear Mr. Richards:

This letter will serve as Oswego Community Unit District No. 308's response to your June 9, 2014, request under the Freedom of Information Act (5ILCS 140/1 et seq.), in which you asked for the above referenced information. Attached are the documents responsive to your request.

To promote district transparency and assist others who may have a similar question, this responsive document will be posted online on the district's website. To access it, go to www.oswego308.org, and then select the FOIA Requests and Responses icon, then select District 308 Responses to FOIA Requests, then FOIA ID #14-23.

Please let me know if you have additional questions. Thank you.

Victoria R. D'Aleo

Victoria R. D'Aleo
Freedom of Information Officer

SCHOOL DISTRICT 308

Agenda Item Details

Meeting	Jun 09, 2014 - Oswego Community Unit School District 308 Board of Education Meeting
Category	8. Action Items
Subject	8.3 Approval of Bids for District-Wide Life Safety Projects to include the replacement of the chiller/boiler at The Wheatlands, chiller at Fox Chase, and roof at Oswego High School
Type	Action

BACKGROUND:

On Monday, April 14, 2014, the Board of Education authorized the request to accept bids for the District Life Safety Projects. June 4, 2014 bids were publicly opened and read aloud. Bid results are attached.

Below is the Administration's recommendation for approval.

Bid Package	Project	Budget	Base Bid
1.	Fox Chase Chiller Replacement The Wheatlands Chiller / Boiler Replacement	$1,075,000.00	$839,300.00
2.	OHS – Roof Replacement	$250,000.00	$494,000.00
	TOTAL	**1,325,000.00**	**$1,333,300.00**

The low base bid for Bid Package #1 was submitted by Amber Mechanical from Alsip, IL, in the amount of $839,300.

The low base bid for Bid Package #2 was submitted by Olsson Roofing from Aurora, IL, in the amount of $494,000.00.

A Bid Qualification and Scope Review was conducted with both contractors and we believe their bids to be responsive and complete. Amber

Mechanical has successfully completed numerous projects on time and within budget throughout the school district. Olsson Roofing has also completed numerous projects on time and within budget.

The Board may choose to award the following contracts:

- Amber Mechanical in the amount of $839,300.00 for the Chiller Replacement at Fox Chase Elementary and the Replacement of the Chiller and Boiler at The Wheatlands Elementary
- Olsson Roofing in the amount of $494,000.00 for the Roof Replacement at Oswego High School

Chillers_Roof.pdf (15 KB)

Motion & Voting

to accept the low bids for District Life Safety Projects, as listed, in the amount of $1,333,300.00.

Motion by Mrs Danielle Paul, second by Mr Michael McDowell.

DISTRICT LIFE SAFETY PROJECTS

Fox Chase Chiller Replacement / The Wheatlands Chiller / Boiler Replacement

Bid Opening June 4, 2014 2:00PM

	Base Bid	*Alternate 1 - Replace TW's B.A.C*	*Alternate 2 - Replace FC's B.A.C*	Total
Amber Mechanical	$ 839,300.00	$ 37,300.00	$ 35,200.00	$ 911,800.00
Premier Mechanical	$ 851,000.00	$ 44,500.00	$ 47,000.00	$ 942,500.00
Quality Control	$ 869,000.00	$ 34,900.00	$ 37,000.00	$ 940,900.00
C. Acitelli	$ 890,000.00	$ 35,000.00	$ 38,000.00	$ 963,000.00
F.E. Moran	$ 955,800.00	$ 39,400.00	$ 41,500.00	$ 1,036,700.00
Mechanical Concepts	$ 965,000.00	$ 31,600.00	$ 33,700.00	$ 1,030,300.00
Monaco Mechanical	$ 1,121,000.00	$ 42,800.00	$ 44,600.00	$ 1,208,400.00

OHS Roofing Replacement

Bid Opening June 4, 2014 3:00PM

	Base Bid	Alternate 1 Stage Roof	Alternate 2 Base Bid plus 20 yr Warranty	Alternate 3 Stage Roof plus 20 yr Warranty	Total
Olsson Roofing	$ 494,000.00	$ 52,300.00	$ 1,500.00	$ 500.00	$ 548,300.00
Metalmaster Roofmaster	$ 523,870.00	$ 58,430.00	$ -	$ -	$ 582,300.00

PROJECT MANUAL
FOR

THE WHEATLANDS AND FOX CHASE SCHOOLS
HVAC RENOVATIONS
2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503
260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543

OWNER

OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308
4175 ROUTE 71
OSWEGO, ILLINOIS 60543

ARCHITECT

KLUBER ARCHITECTS + ENGINEERS
10 S. SHUMWAY AVE.
BATAVIA, ILLINOIS 60510

DATE: MAY 20, 2014
PROJECT NO. 14-158-901

SECTION 00 01 01
PROJECT TITLE PAGE

PROJECT MANUAL

FOR

THE WHEATLANDS AND FOX CHASE SCHOOLS - HVAC RENOVATIONS

2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503

260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543

OWNER

OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308

4175 ROUTE 71

OSWEGO, ILLINOIS 60543

ARCHITECT/ENGINEER

KLUBER ARCHITECTS + ENGINEERS

10 S. SHUMWAY AVE.

BATAVIA, ILLINOIS 60510

END OF DOCUMENT

SECTION 00 01 07
SEALS PAGE

1.01 DESIGN PROFESSIONALS' SEALS

A. ARCHITECT B. MECHANICAL ENGINEER C. ELECTRICAL ENGINEER

END OF DOCUMENT

SECTION 00 01 10
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END OF TABLE OF CONTENTS

SECTION 00 01 15
DRAWING INDEX

GENERAL

G100	COVER SHEET, GENERAL NOTES, SYMBOLS & DRAWING INDEX

ARCHITECTURAL

A300	THE WHEATLANDS MECHANICAL ROOM FLOOR PLANS AND ROOF PLANS
A301	FOX CHASE MECHANICAL ROOM FLOOR PLANS AND ROOF PLANS

MECHANICAL

M300	THE WHEATLANDS SECOND FLOOR MECHANICAL PLANS
M301	FOX CHASE SECOND FLOOR MECHANICAL PLANS
M400	THE WHEATLANDS MECHANICAL DETAILS AND SCHEDULES
M401	FOX CHASE MECHANICAL DETAILS AND SCHEDULES

ELECTRICAL

E300	THE WHEATLANDS FIRST & SECOND FLOOR ELECTRICAL PLANS
E301	FOX CHASE FIRST AND SECOND FLOOR ELECTRICAL PLANS

END OF DOCUMENT

SECTION 00 11 13
ADVERTISEMENT FOR BIDS

PROJECT:	**THE WHEATLANDS AND FOX CHASE SCHOOLS - HVAC RENOVATIONS** **2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503** **260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543**
OWNER:	**OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308** **4175 ROUTE 71** **OSWEGO, ILLINOIS 60543**
ARCHITECT/ ENGINEER:	**KLUBER ARCHITECTS + ENGINEERS** **10 S. SHUMWAY AVENUE** **BATAVIA, ILLINOIS 60510**

DESCRIPTION OF THE WORK:

The Owner will receive bids for the construction of a new chiller for Fox Chase Elementary School and a new chiller and new boilers for The Wheatlands Elementary School. The Work will include: demolition of existing chillers and boilers, roof demolition and creation of a roof hatch at each school for equipment access to second floor mechanical rooms, and electrical service upgrades at each school.

BASIS OF BIDS:

Bids will be a single contract, stipulated sum.

TIME OF COMPLETION:

The Work will commence on Tuesday, June 10, 2014 and be performed such that the Project will be Substantially Complete as indicated in the Document 00 31 13 - Preliminary Schedule.

BID OPENING:

Sealed bids for all Contracts will be received by the Owner until 2:00 p.m. on Wednesday, June 4, 2014 in a sealed envelope addressed with the name of the Bidder, Owner, name of the Project, and the date and time of the Bid. Deliver to the Oswego School District Building Services Facility at 71 Stonehill Road, Oswego, Illinois 60543. Bids will be publicly opened at that time.

EXAMINATION AND PROCUREMENT OF DOCUMENTS:

The Bidding Documents will consist of one full set of Drawings and one Project Manual.

The Bidding Documents may be viewed free of charge online at www.kluberplanroom.com. Click on "Public Jobs", then "View Plans" or "View Specs" to browse through the drawings or

specifications. No bid deposit is required to obtain the Bidding Documents. Full sets of plans and specifications in PDF format may be downloaded for a one-time charge of $9.95. Printed copies of plans and specifications may be obtained for the cost of reproduction as indicated at the www.kluberplanroom.com project website.

The Bidding Documents may be examined at the Architect's office:
Batavia, Illinois Office: 10 S. Shumway Ave., Batavia, IL 60510.

and online at the following URL(s):
McGraw-Hill Construction Dodge: www.construction.com.
Reed Construction Data: www.reedconstructiondata.com.

BID SECURITY:

A Bid security in the amount of 10 percent of the total Bid is required.

PRE-BID MEETING:

A pre-bid meeting will be held at Fox Chase Elementary School, 260 Fox Chase Drive N., Oswego, Illinois 60543, in the LRC at 4:00 p.m. on Thursday, May 22, 2014. Prospective bidders are requested to attend.

RIGHT TO REJECT BIDS:

The Owner reserves the right to reject any and all bids and to waive any errors, omissions or irregularities in the bids or the bidding procedure when, in the opinion of the Owner, such action will serve its best interests. Any bid which is not accompanied by the required bid security or by any other documents or certifications required by the Bidding Documents, and any bid which is in any way incomplete or irregular, is subject to rejection at the sole discretion of the Owner.

GOVERNING LAWS AND REGULATIONS:

Prevailing wage rates will apply and must be included in the Bid amount.

END OF DOCUMENT

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

1.01 FORM OF INSTRUCTIONS TO BIDDERS

A. AIA Document A701 (1997 Edition) - Instructions To Bidders is hereby made part of the Bidding Requirements to the same extent as if written out in full.

B. The above document may be examined at the Owner's office or purchased at the American Institute of Architects, http://www.aia.org/docs_purchase&defPr=1.

END OF DOCUMENT

SECTION 00 22 13
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.01 GENERAL

A. These Supplementary Instructions To Bidders modify, amend or supplement the Instructions To Bidders (AIA Document A701, 1997 Edition). Provisions which are not so modified, amended or supplemented remain in full force and effect.

1.02 ARTICLE 2 BIDDER'S REPRESENTATIONS

A. Add new Section 2.1.5 to read as follows:

"§ 2.1.5 The Bidder acknowledges that some of the existing conditions shown in the Bidding Documents are presented for information as an approximation and are not a substitute for the Bidder's required field verification of existing conditions relating to the Work. Failure to make the necessary field examinations will not relieve the Bidder from any of the requirements of the Contract Documents."

B. Add new Section 2.1.6 to read as follows:

"§ 2.1.6 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of Article 2 and that the Bidding Documents are sufficient in scope and detail to indicate and convey understanding of all the terms and conditions for execution of the Work."

1.03 ARTICLE 3 BIDDING DOCUMENTS

A. § 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

1. Append the following to the end of Section 3.2.2:

"Questions about the meaning or intent of the Bidding Documents shall be submitted to Owner in writing (fax is acceptable). Replies will be issued by Addenda faxed, mailed or delivered to all Bid Document recipients. Questions received less than three (3) days prior to the Bid opening date will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect."

B. § 3.3 SUBSTITUTIONS

1. Append the following to the end of Section 3.3.2:

"Substitution requests must be submitted in writing to the Owner with substantiating data as required in Section 01 60 00. Oral requests will not be taken."

1.04 ARTICLE 4 BIDDING PROCEDURES

A. § 4.1 PREPARATION OF BIDS

1. Append the following to the end of Section 4.1.1:

"Bids shall be submitted in duplicate."

B. § 4.2 BID SECURITY

1. Add new Section 4.2.1.1:

"§ 4.2.1.1 Bid security in the form of a certified check, cashiers check or bid bond made payable to the Owner in the amount of 10% of the Base Bid must be attached to the submitted Bid. Bid security shall be retained until an executed Contract and Performance and Payement Bonds are received. The Owner reserves the right to retain the bid security of the next two low bidders until the lowest bidder has executed a Contract."

C. Add new Section 4.5 to read as follows:
   1. "§ 4.5 PRE-BID MEETING
      § 4.5.1 A pre-bid conference has been scheduled as designated in the Advertisement for Bids. Representatives of the Owner and Owner will be in attendance. Information relevant to the Bid Documents will be recorded in an Addendum to be issued to all Bid Document recipients."

1.05 ARTICLE 5 CONSIDERATION OF BIDS

A. § 5.2 REJECTION OF BIDS
   1. Delete Section 5.2 REJECTION OF BIDS in its entirety and replace with the following:
      "§ 5.2 REJECTION OF BIDS
      Owner reserves the right to reject any and all bids and to waive any errors, omissions or irregularities in the bids or the bidding procedure when, in the opinion of the Owner, such action will serve its best interests. Any bid which is not accompanied by the required bid security or by any other documents or certifications required by the Bidding Documents, and any bid which is in any way incomplete or irregular, is subject to rejection at the sole discretion of the Owner."

B. § 5.3 ACCEPTANCE OF BID (AWARD)
   1. Add new Section 5.3.3 to read as follows:
      "§ 5.3.3 It is the intent of the Owner to award a Contract to the lowest responsible and qualified Bidder within 90 days after the day of the Bid opening."

1.06 ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

A. § 7.1 BOND REQUIREMENTS
   1. Delete Section 7.1.1 in its entirety and replace with the following:
      "§ 7.1.1 The Bidder shall furnish Performance and Payment Bonds in accordance with the Supplementary Conditions."

1.07 ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. Add new Section 8.2 to read as follows:
   "§ 8.2 The Owner shall deliver to the successful Bidder at least three unsigned counterparts of the Agreement and all other Contract Documents. Within seven days thereafter Bidder shall sign and deliver three counterparts of the Agreement to Owner with other Contract Documents attached. Within ten days thereafter Owner will deliver one fully signed counterpart to Bidder."

B. Add new Section 8.3 to read as follows:
   "§ 8.3 Provisions for Owner's Tax Exemption are set forth in the Supplementary Conditions."

END OF SECTION

SECTION 00 31 13
PRELIMINARY SCHEDULE

1.01 GENERAL

A. The following represents the preliminary construction schedule for the Work. This schedule is the current estimate of the Owner to be used for purposes of bidding. All bidders shall include the costs of all overtime, double-shift, or so-called "premium" time that may be necessary to meet this milestone.

1.02 PRELIMINARY SCHEDULE

A. Award of Contract: Anticipated to be June 9, 2014.

B. Commencement of Construction: June 10, 2014.

C. Substantial Completion: August 11, 2014.

END OF SECTION

SECTION 00 41 13
BID FORM - STIPULATED SUM

SINGLE CONTRACT

PROJECT: **THE WHEATLANDS AND FOX CHASE SCHOOLS - HVAC RENOVATIONS**
2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503
260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543

BID TO: **OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308**
4175 ROUTE 71
OSWEGO, ILLINOIS 60543

BID FROM:

Corporate Name: _____
Address: _____
City, State, Zip: _____
Telephone No.: _____
Fax No.: _____
Email Address: _____
Contact Person: _____

1.01 ACCEPTANCE

The undersigned Bidder agrees, if this Bid is accepted, to enter into an agreement with the Owner, in the form included in the Bidding Documents, to perform and furnish the Work as indicated in the Bidding Documents for the Bid Price and within the Bid times indicated in this Bid and in accordance with the terms and conditions of the Contract Documents.

1.02 ACKNOWLEDGMENTS

In submitting this Bid, the Bidder represents that:

A. This Bid will remain open for acceptance for a period of 90 days from the Bid opening date;

B. The Owner has the right to reject this Bid;

C. The Bidder accepts the provisions of the Instructions and Supplementary Instructions to Bidders regarding the disposition of the Bid;

D. The Bidder agrees to sign and submit the Agreement and other documents required by the Bidding Requirements within 15 days after the Owner's Notice of Award;

E. The Bidder has examined the complete set of Bidding Documents;

F. The Bidder has visited the site and become familiar with the general, local, and site conditions;

G. The Bidder is familiar with Federal, State and Local Laws and Regulations;

H. The Bidder has correlated the information known to the Bidder; information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. This Bid is genuine and not made in the interest of or on behalf of an undisclosed person, firm, or corporation and is not submitted in conformity with an Agreement or rules or group, association, organization, or corporation;

J. The Bidder has not directly or indirectly induced or solicited another Bidder to submit a false or sham Bid; sought by collusion to obtain for itself an advantage over another Bidder or over the Owner;

K. The Bidder has received the following Addenda, receipt of which is hereby acknowledged:

1. Addendum No. _____Date _____

2. Addendum No. _____Date _____

3. Addendum No. _____Date _____

The Bidder understands that, in submitting this Bid, he waives all right to plead any misunderstandings regarding the foregoing.

1.03 SINGLE CONTRACT - BASE BID PRICE:

A. Refer to Section 01 10 00 - Summary.

B. The Bidder will complete the Work of the Project in accordance with the Contract Documents for the following price:

1. Stipulated Sum Bid Price:

_____

(Use Numerals)

_____

(Use Words)

1.04 BID BOND

A. The Bidder has attached the required bid security in the form described by Document 00 43 13-Bid Security Form with this Bid.

1.05 ALLOWANCES

A. The Bidder has included in the Bid the appropriate allowances as specified in Section 01 21 00 - Allowances.

1.06 ALTERNATES

A. The Bidder has attached Document 00 43 23 - Bid Form Supplement - Alternates with this Bid. Refer to Section 01 23 00 - Alternates for description of alternates.

1.07 CONTRACT TIME

A. The Bidder agrees to begin and complete Work as indicated in Document 00 31 10 - Preliminary Schedule.

1.08 OTHER BID FORM SUPPLEMENTS

A. The following additional Documents are attached to and made a condition of this Bid:
   1. Document 00 43 36 - Proposed Subcontractors Form.
   2. Document 00 45 13 - Bidder's Qualifications.
   3. Document 00 45 36 - Equal Employment Opportunity Affidavit.
   4. Document 00 45 46.01 - Contractor's Certification of Legal Eligibility For Bidding.
   5. Document 00 45 46.02 - Contractor's Drug Free Workplace Certification.
   6. Document 00 45 46.05 - Smoking/Tobacco Policy Compliance Certificate.

1.09 SIGNATURES

A. Respectfully submitted this _____ day of _____, 2014.

B. Type of Firm: (check one)

_____ Individual

_____ Partnership

_____ Corporation

_____ Joint Venture

C. Corporate Seal:(SEAL)

D. Full name of firm: _____

E. Authorized Signing Officer: _____

Title: _____

F. Authorized Signing Officer: _____

Title: _____

END OF DOCUMENT

SECTION 00 43 13
BID SECURITY FORM

1.01 FORM OF BID BOND

A. AIA Document A310 (2010 Edition) - Bid Bond Form.

B. The above document may be examined at the Owner's office or purchased at the American Institute of Architects, http://www.aia.org/docs_purchase&defPr=1.

END OF DOCUMENT

SECTION 00 43 23
BID FORM SUPPLEMENT - LIST OF ALTERNATES

1.01 PARTICULARS

A. The following is the list of Alternates referenced in the bid submitted by:

(Bidder) _____

Dated _____ and which is an integral part of the Bid Form.

1.02 ALTERNATES LIST

A. The following amounts shall be added to or deducted from the Bid Amount. Refer to Section 01 23 00 - Alternates: Schedule of Alternates.

(Circle One)

1. Alternate # ____: (Add) (Deduct) $ _____
2. Alternate # ____: (Add) (Deduct) $ _____
3. Alternate # ____: (Add) (Deduct) $ _____
4. Alternate # ____: (Add) (Deduct) $ _____
5. Alternate # ____: (Add) (Deduct) $ _____
6. Alternate # ____: (Add) (Deduct) $ _____
7. Alternate # ____: (Add) (Deduct) $ _____
8. Alternate # ____: (Add) (Deduct) $ _____
9. Alternate # ____: (Add) (Deduct) $ _____
10. Alternate # ____: (Add) (Deduct) $ _____

END OF DOCUMENT

SECTION 00 43 36
PROPOSED SUBCONTRACTORS FORM

Herewith is the list of Subcontractors / Suppliers referenced in the bid submitted by:

(Bidder) _____

Dated _____ **and which is an integral part of the Bid Form.**

List one name for each line item. Failure to list the requested subcontractor or supplier, or listing multiple names will render the Bid "non-responsive" and the Bid will be subject to disqualification at the Owner's sole discretion. If Bidder will self-perform the work subject item, please enter the Bidder's name or write "self-perform" in the space provided.

Bidder agrees that, if awarded the Contract for this Project, he will contract with the subcontractors and suppliers indicated below, and will not deviate without express written authorization from the Owner.

The following work will be self-performed, or performed by subcontractors, or provided by suppliers, and coordinated by us:

1.01 LIST OF SUBCONTRACTORS AND SUPPLIERS

WORK SUBJECT		SUBCONTRACTOR / SUPPLIER NAME
A.	Concrete Contractor	_____
B.	Steel Fabricator	_____
C.	General Trades / Carpentry Contractor	_____
D.	Roofing Contractor	_____
E.	Mechanical Piping Contractor	_____
F.	Sheet Metal Contractor	_____
G.	Condensing Boiler Manufacturer	_____
H.	Temperature Controls Contractor	_____
I.	Electrical Contractor	_____
J.	Testing and Balancing Contractor	_____

END OF DOCUMENT

SECTION 00 45 13
BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. Attach additional pages if needed.

1. Name of Bidder _____
2. Names of principals _____
3. Names of authorized signatories _____
4. Permanent main office address _____
5. When organized _____
6. Where incorporated _____
7. How many years engaged in contracting business under present company name?
   _____
8. Previous names of companies in which the principals listed in Item 2. above have engaged in the contracting business _____
   _____
   _____
9. List contracts on hand by name of contract and gross amount
   _____
   _____
10. Have you ever defaulted on a contract? _____
    If so, where and why? _____
    _____
    _____
    _____
11. Have you ever refused to sign a contract at your original bid? _____
    If yes, explain _____
    _____
    _____

12. Names, background, experience and current workload of the principal members of your personnel, including the office:
    NameBackground Years in Contracting Current Workload
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____

13. Furnish written evidence of amount and type of credit available.

14. Will you, upon request, submit a detailed Financial Statement and furnish any other information that may be required by the Owner? _____

15. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the Owner, in verification of the recitals comprising the Bid Form Supplement - Contractor's Qualifications.

    Dated at _____,

    this ____ day of _____, 20____.

    _____
    (Name of Bidder)

    By: _____
    (Signature of Bidder's Representative)

    Title: _____

END OF DOCUMENT

SECTION 00 45 36
CONTRACTOR'S CERTIFICATION FOR EQUAL EMPLOYMENT OPPORTUNITY

1.01 EQUAL OPPORTUNITY EMPLOYMENT CLAUSE

A. Required by the Illinois Fair Employment Practices Commission as a material term of all public contracts.

1.02 EQUAL EMPLOYMENT OPPORTUNITY

A. In the event of the contractor's noncompliance with any provision of this Equal Employment Opportunity Clause, the Illinois Fair Employment Practices Act or the Fair Employment Practices Commission's Rules and Regulations for Public Contracts, the contractor may be declared nonresponsible and therefore ineligible for future contracts or sub-contracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be canceled or avoided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

B. During the performance of this contract, the contractor agrees as follows:
   1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
   2. That, if it hires additional employees in order to perform this contract, or any portion hereof, it will determine availability (in accordance with the Commission's Rules and Regulation for Public Contracts) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
   3. That, in all solicitations or advertisements for employees placed by it or its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, national origin or ancestry.
   4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice, advising such labor organization or representative of the contractor's obligations under the Illinois Fair Employment Practices Act and Commission's Rules and Regulations, the contractor will promptly so notify the Illinois Fair Employment Practices Commission and the Contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

5. That it will submit reports as required by the Illinois Fair Employment Practices Commission's Rules and Regulation for Public Contracts, furnish all relevant information as may from time to time be requested by the Commission or the contracting agency, and in all respects comply with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public contracts.
6. That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Illinois Fair Employment Practices Commissions for Purposes of Investigation to ascertain compliance with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
7. That it will include verbatim or by reference the provisions of paragraphs 1 through 7 of this clause in every performance subcontract as defined in Section 2.10 (b) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every such subcontractor. In the same manner as with other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by all its subcontractors; and further it will promptly notify the contracting agency and the Illinois Fair Employment Practices Commission in the event any subcontractor fails or refuses to comply therewith. In addition, no contractor will utilize any subcontractor declared by the Commission to be nonresponsible and therefore ineligible for contracts for subcontracts with the State of Illinois or any of its political subdivision or municipal corporations.

C. With respect to the two types of subcontracts referred to under paragraph 7 of the Equal Employment Opportunity Clause above, following is an excerpt of Section 2 of the EDPC's Rules and Regulations for Public Contracts:
   1. "Section 2.10. the term "Subcontract" means any agreements, arrangement or understanding, written or otherwise, between a contractor and any person (in which the parties do not stand in the relationship of any employer and employee):
      a. For the furnishing of supplies or services or for the use of real or personal property, including lease arrangements, which, in whole or in part, is utilized in the performance of any one or more contract; or
      b. Under which any portion of the contract's obligation under any one or more contracts is performed, undertaken or assumed."

D. _____, (Name of Contractor)

having submitted a bid/proposal for the project identified in Document 00001, hereby certifies that said Contractor will comply fully with the Equal Employment Opportunity Clause.

By: _____
Authorized Agent of Contractor

Subscribed and sworn to before me

this _____ day of _____, 20____.

_____

Notary Public

END OF SECTION

SECTION 00 45 46.01
CONTRACTOR'S CERTIFICATION OF LEGAL ELIGIBILITY FOR BIDDING

1.01 CONTRACTOR'S CERTIFICATION OF LEGAL ELIGIBILITY FOR BIDDING

A. _____ as part of its bid on a contract for the project

(Name of Contractor)

as identified in Document 00001, hereby certifies that said contractor is not barred from bidding on the aforementioned contract as a result of a violation of either Section 33E-3 (bid rigging) or 33E-4 (bid rotating) of Article 33E of Chapter 38 of the Illinois Revised Statutes.

By: _____
Authorized Agent of Contractor

Subscribed and sworn to before me

This _____ day of _____, 2014.

_____

Notary Public

END OF SECTION

SECTION 00 45 46.02
CONTRACTOR'S DRUG-FREE WORKPLACE CERTIFICATION

1.01 CONTRACTOR'S DRUG-FREE WORKPLACE CERTIFICATION

A. Pursuant to Chapter 30, Section 580/1 of the Illinois Compiled Statutes (30 ILCS 580/1) et. seq. entitled "Drug Free Workplace Act", the undersigned contractor hereby certifies to the Board of Education of Oswego Community Unit School District 308 that it will provide a drug-free workplace by:
   1. Publishing a statement:
      a. Notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance, including cannabis, is prohibited in the grantee's of contractor's workplace.
      b. Specifying the actions that will be taken against employees for violations of such prohibition.
      c. Notifying the employee that, as a condition of employment on such contract or grant, the employee will:
         1) abide by the terms of the statement; and
         2) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than 5 days after such conviction.
   2. Establishing a drug free awareness program to inform employees about:
      a. the dangers of drug abuse in the workplace;
      b. the grantee's or contractor's policy of maintaining drug free workplace;
      c. any available drug counseling, rehabilitation, and employee assistance program; and
      d. the penalties that may be imposed upon employees for drug violations.
   3. Making it a requirement to give a copy of the statement required by subsection (a) to each employee engaged in the performance of the contract or grant and to post the statement in a prominent place in the workplace.
   4. Notifying the contracting agency within 10 days after receiving notice under part (B) of paragraph (3) of subsection (a) from an employee or otherwise receiving actual notice of such conviction.
   5. Imposing a sanction on, or requiring the satisfactory participation in a drug assistance or rehabilitation program by any employee who is so convicted, as required by Section 5 (30 ILCS 580/5) of the Act.
   6. Assisting employees in selecting a course of action in the event drug counseling treatment, and rehabilitation is required and indicating that a trained referral team in place.
   7. Making a good faith effort to continue to maintain a drug free workplace through implementation of Section 3 of the Drug Free Workplace Act.

B. Failure to abide by this Contractor's Drug Free Workplace Certification shall subject the Contractor to the penalties set forth in Sections 6, 7 and 8 of the the Drug Free Workplace Act.

C. Notice: This Contractor's Drug Free Workplace Certification is to be completed by any corporations, partnerships or other entities with twenty-five or more employees at the time of the contract, or a department, division or unit therof, directly responsible for the performance of a contract of $5,000 or more with the School District.

_____
Name of Contractor

By: _____

Its: _____

Attest:

By: _____

Its: _____

DATED: _____

2.01 INDIVIDUAL'S DRUG-FREE WORKPLACE CERTIFICATION

A. Pursuant to Chapter 30, Section 580/1 of the Illinois Compiled Statutes (30 ILCS 580/1) et. seq. entitled "Drug Free Workplace Act", the undersigned individual hereby certifies to the Board of Education of Oswego Community Unit School District 308 that the individual will not engage in the unlawful manufacture, distribution, posession or use of a controlled substance in the performance of the contract.

B. Failure to abide by this Contractor's Drug Free Workplace Certification shall subject the individual to the penalties set forth in Sections 6, 7 and 8 of the the Drug Free Workplace Act.

C. Notice: This Individual's Drug Free Workplace Certification is to be completed by any individual directly responsible for the performance of a contract of $5,000 or more with the School District.

_____
Name of Individual

Signature: _____

DATED: _____

END OF DOCUMENT

SECTION 00 45 46.05
SMOKING/TOBACCO POLICY COMPLIANCE CERTIFICATE

OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308 SMOKING / TOBACCO POLICY

The use of Tobacco by any school personnel, student, or other person is prohibited on the school property of Oswego Community unit school District 308 when such property is being used for any school purposes. This prohibition will apply to such property before, during, and after the regular school day and on days when school is not in session.

The term "Tobacco" will mean cigarettes, cigars, pipes, or tobacco in any form including smokeless tobacco which is nay loose, cut, shredded, ground, powdered, compress or leaf tobacco that is intended to be placed in the mouth without being smoked.

Property" will include, without limitation, any area within a building or other indoor facility used for school purposes, and the areas outside of such buildings and facilities, whether owned, leased or contracted for by the district.

Purposes" will include all events, Activities or other uses of school property that the Board or the officials of the district authorize or permit thereon, including without limitation, all interscholastic or extra-curricular athletic, academic or other events sponsored by the Board or in which pupils of the District participate.

The action is being taken in compliance with the Illinois School Code, Section 10-20.5B; Goal 2000: Educate America Act, Part C, (The "Pro-Children Act of 1994").

_____,
(Name of Contractor)

having submitted a bid/proposal for the project identified in Document 00001, hereby certifies that said Contractor will comply fully with the foregoing Smoking/Tobacco Policy.

By: _____
Authorized Agent of Contractor

Subscribed and sworn to before me

this _____ day of _____, 20____.

_____

Notary Public

END OF SECTION

SECTION 00 52 00
AGREEMENT FORM

1.01 FORM OF AGREEMENT

A. AIA Document A101, Owner-Contractor Agreement Form - Stipulated Sum (2007 Edition), forms the basis of Contract between the Owner and Contractor.

B. The above document may be examined at the Architect's office or purchased at the American Institute of Architects, http://www.aia.org/docs_purchase&defPr=1.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions.

B. Document 00 73 00 - Supplementary Conditions.

END OF DOCUMENT

SECTION 00 72 00
GENERAL CONDITIONS

1.01 FORM OF GENERAL CONDITIONS

A. The General Conditions applicable to this contract is attached following this page.

B. AIA Document A201 - 2007 "General Conditions of the Contract for Construction" is the General Conditions between the Owner and Contractor.

C. The above document may be examined at the Architect's office or purchased at the American Institute of Architects, http://www.aia.org/docs_purchase&defPr=1.

1.02 RELATED REQUIREMENTS

A. Section 00 73 00 - Supplementary Conditions.

1.03 SUPPLEMENTARY CONDITIONS

A. Refer to Document 00 73 00 for amendments to these General Conditions.

END OF DOCUMENT

SECTION 00 73 00
SUPPLEMENTARY CONDITIONS

1.01 GENERAL

A. The Supplementary Conditions contain modifications and additions to AIA Document A201 - 2007 "General Conditions of the Contract for Construction". Where a portion of the General Conditions is modified, deleted or voided by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

1.02 ARTICLE 1 GENERAL PROVISIONS

A. § 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
   1. Add new Section 1.2.2.1 as follows:
      "§ 1.2.2.1 Sections of Division 1 - General Requirements govern the execution of the Work of all Sections of the specifications."

B. § 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE
   1. After the first sentence of Section 1.5.1, insert the following:
      "These Instruments of Service are the tangible rendering of professional opinions and service for the Owner and are not, therefore, a commodity, product or good. No warranties, express or implied, are made by the Architect to the Contractor concerning those Instruments of Service."

1.03 ARTICLE 2 OWNER

A. § 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
   1. Delete the third sentence of Section 2.2.1.
   2. Delete Section 2.2.5 in its entirety and replace with the following:
      "§ 2.2.5 The contractor will be furnished, free of charge, all returned bidding copies of the drawings and project manuals. The Contractor will be furnished as many additional copies as the Contractor may require, at the cost of reproduction."

B. Add new Section 2.5 as follows:
   "§ 2.5 OWNER'S REMEDIES NOT EXCLUSIVE
   § 2.5.1 The rights and remedies of Owner stated in this Article 2 shall be in addition to and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity."

1.04 ARTICLE 3 CONTRACTOR

A. § 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTACTOR
   1. Delete Section 3.2.1 in its entirety and replace with the following:
      "§ 3.2.1 Execution of the Contract by the Contractor is a representation by the Contractor, that the Contract Documents are full and complete, are sufficient to enable the Contractor to determine the cost of the Work and that the Contract Documents are sufficient to enable it to construct the Work outlined therein, in accordance with applicable laws and regulations, and otherwise to fulfill all its obligations hereunder, including, but not limited to, Contractor's

obligations to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Completion established in the Agreement. The Contractor further acknowledges and declares that it has visited and examined the Project site, examined all physical and other conditions affecting the Work and is fully familiar with all of the conditions thereon and thereunder affecting the same. In connection therewith, Contractor specifically represents and warrants to Owner that prior to the submission of its bid it has: (a) thoroughly examined the location of the Work to be performed, is familiar with local conditions, and has read and thoroughly understands the Contract Documents as they relate to the physical conditions prevalent or likely to be encountered in the performance of the Work at such location; (2) examined the nature, location and character of the general area in which the Project is located, including without limitation, its climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; and (3) examined the quality and quantity of all materials, supplies, tools, equipment, labor, and professional services necessary to complete the Work in the manner and within the cost and time frame required by the Contract Documents."

2. Delete Section 3.2.3.
3. Add new Section 3.2.5 as follows:

"§ 3.2.5 Prior to any excavation, the Contractor shall determine the locations of all existing water, gas, sewer, electric, telephone, telegraph, television, irrigation, petroleum pipelines, and other underground utilities and structures. Where the locations of existing underground and surface utilities and structures are indicated, these locations are generally approximate, and all items that may be encountered during the work are not necessarily indicated. The Contractor shall determine the exact locations of all items indicated, and the existence and locations of all items not indicated."

B. § 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

1. Add new Sections 3.3.4 through 3.3.7 as follows:

"§ 3.3.4 The Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work, including without limitation, deliveries, storage, installations, and construction utilities with that of all others on the Project. 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 method of overall installation.

§ 3.3.5 All manufactured articles, material and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer, unless herein specified to the contrary.

§ 3.3.6 After commencing the work, the Contractor shall use every precaution to avoid interferences with existing underground and surface utilities and structures, and protect them from damage. The Contractor shall repair or pay for all damage caused by his operations to all existing utility lines, public property, and private property, whether it is below ground or above ground, and he shall settle in total cost of all damage suits which may arise as a result of his operations at no additional costs to the Owner. To avoid

unnecessary interferences or delays, the Contractor shall coordinate all utility removals, replacements and construction with the appropriate utility company. The cost of temporarily relocating utilities for convenience of the Contractor, shall be paid by Contractor.
§ 3.3.7 The Contractor shall establish and maintain benchmarks and all other grades, lines, and levels necessary for the Work, report errors or inconsistencies to the Owner and Architect before commencing Work, and review the placement of the building and permanent facilities on the site with the Owner and Architect after all lines are staked out and before foundation Work is started."

C. § 3.4 LABOR AND MATERIALS
   1. Delete Section 3.4.2 in its entirety and replace with the following:
      "§ 3.4.2 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Section 01 60 00)."
   2. Add new Section 3.4.4 as follows:
      "§ 3.4.4 The Contractor and each Subcontractor shall pay not less than the general prevailing rate of hourly wages for work of a similar character in the locality in which the work is performed and not less than general prevailing rate of hourly wages for legal holidays and overtime work in the performance of work under this Contract, as established by the Illinois Department of Labor, pursuant to an act of the General Assembly of the State of Illinois. In accordance with applicable law, Contractor and each Subcontractor shall keep an accurate record showing the names and occupation of all laborers, workers and mechanics employed by them, and also showing the actual hourly wages paid to each such individual, which record shall be open at all reasonable hours to inspection by the Owner, its officers and agents, and to agents of the Illinois Department of Labor. The Contractor and each Subcontractor hereby agree, jointly and severally, to defend, indemnify and hold harmless the Owner from any and all claims, demands, liens or suits of any kind or nature whatsoever (including suits for injunctive relief) by the Illinois Department of Labor under the Illinois Prevailing Wage Act, or by any laborer, worker or mechanic employed by the Contractor or the Subcontractor who alleges that he has been paid for his services in a sum less than prevailing wage rates required by Illinois law. The Owner agrees to notify the Contractor or Subcontractor of the pendency of any such claim, demand, lien or suit. Contractor must pay prevailing wages in effect at time labor is performed."

D. § 3.6 TAXES
   1. Delete Section 3.6.1 in its entirety and replace with the following:
      "§ 3.6.1 The Owner is exempt from the Illinois Use Tax Act and the Retailer's Occupation Tax. Any taxes for which the Owner is not exempt shall be paid by the Contractor."

E. § 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS
   1. Delete Section 3.7.4 in its entirety.

F. § 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES
   1. Delete Section 3.10.1 in its entirety and replace with the following:
      "§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall indicate the proposed completion dates for the various

subdivisions of the Work, as well as the totality of the Work. The schedule shall be updated every thirty (30) days and submitted to Architect with Contractor's Applications for Payment. Each schedule shall contain a comparison of actual progress with the estimated progress for such point in time stated in the original schedule. If any schedule submitted sets forth a date for Completion for the Work or any phase of the Work beyond the date(s) of Completion established in the Contract (as the same may extended as provided in the Contract Documents), then Contractor shall submit to Architect and Owner for their review and approval a narrative description of the means and methods which Contractor intends to employ to expedite the progress of the Work to ensure timely completion of the various phases of the Work as well as the totality of the Work. To ensure such timely completion, Contractor shall take all necessary action including, without limitation, increasing the number of personnel and labor on the Project and implementing overtime and double shifts. In that event, Contractor shall not be entitled to an adjustment in the Contract Sum of the schedule. The Owner may, in its discretion, choose to withhold any payment due the Contractor until an updated schedule is submitted. The Owner's or Architect's failure to object to a submitted schedule that exceeds time limits current under the Contract Documents shall not relieve the Contractor of its obligations to meet the time limits in the Contract Documents, nor shall it make the Owner or Architect liable for any of the Contractor's damages incurred as a result of increased construction time or not meeting the time limits in the Contract Documents. Similarly, the Owner's or Architect's failure to object to a Contractor's schedule showing completion in advance of the time limits in the Contract Documents shall not create or infer any rights in favor of the Contractor for acceleration of the Work."

G. § 3.18 INDEMNIFICATION

1. Delete Section 3.18.1 and replace with the following:
   a. "§ 3.18.1 To the fullest extent permitted by law, the Contractor shall waive any right of contribution against the Owner and shall indemnify and hold harmless the Owner and the Architect and their officers, officials, employees, volunteers and agents from and against all claims, damages losses and expenses, including, but not limited to, legal fees (attorney's and paralegal's fees, expert fees and court costs), arising out of or resulting from the performance of the Contractor's work provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or injury to or destruction of property, other than the work itself, including the loss of use resulting therefrom to the extent it is caused in whole or in part by any wrongful or negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right to indemnity which the Owner would otherwise have. The Contractor shall similarly, protect, indemnify and hold and save harmless, the Owner, its officers, officials, employee, volunteers and agents against and from any and all claims, costs, causes, actions and expenses, including, but not limited to, legal fees, incurred by reason of Contractor's breach of any of its obligations under, or Contractor's default of any provisions of the Contract."
2. Add new Section 3.18.1.1 as follows:

"§ 3.18.1.1 The Contractor and every subcontractor expressly waive all so-called Kotecki rights under the Illinois workers' compensation statutes even though owner has retained all such rights."

1.05 ARTICLE 4 ARCHITECT

A. Add new Section 4.2.11.1 as follows:

"§ 4.2.11.1 Requests For Information (RFIs) requiring timely response shall be presented by the Contractor and answered at Progress Meetings. RFIs not answered at Progress Meetings will require a separate time schedule agreeable to all parties."

1.06 ARTICLE 7 CHANGES IN THE WORK

A. § 7.1 GENERAL
   1. Add new Section 7.1.4 as follows:

"§ 7.1.4 For adjustments to the Contract Sum based on other than the unit price method, overhead, profit and general conditions combined shall be calculated at the following percentages of the cost attributable to the change in the work:

.1For the Contractor, for any Work performed by the Contractor'sown forces: 10 percent of the cost.

.2For the Contractor, for Work performed by his Subcontractor: 5 percent of the amount due the Subcontractor.

.3For each Subcontractor or Sub-subcontractor involved, for anyWork performed by the Subcontractor's own forces: 10 percent ofthe cost.

.4For each Subcontractor, for Work performed by his Sub-subcon- tractors: 5 percent of the amount due the Sub-subcontractor.

.5All proposals, except those less than $200.00, shall beaccompanied by a complete itemization of costs including labor,materials and subcontracts. Labor and materials shall be itemizedin the manner prescribed above. Where major cost items aresubcontracts, they shall be itemized also. In no case will a changeinvolving over $200.00 be approved without such itemization."

B. § 7.3 CONSTRUCTION CHANGE DIRECTIVES
   1. In the first sentence of Section 7.3.6, delete the words: "as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount." and replace with the words: "in accordance with Section 7.1.4".

1.07 ARTICLE 8 TIME

A. Add new Section 8.3.1.1 as follows:

"§ 8.3.1.1 Contractor shall not participate in any secondary boycotts or honor any informational picket lines and shall not receive credit for days or costs associated with any such labor action."

B. Add new Section 8.3.1.2 as follows:

"§ 8.3.1.2 In the event of a labor dispute resulting in a slow-down or in the cessation or suspension of work, the Contractor shall not be relieved of its obligations to provide labor or for timely progress and completion of the work. In such event, the notice provisions contained in Section 2.4.1 shall not apply. Instead, the Contractor shall be automatically deemed to be in

default and to have committed a breach of contract unless said work stoppage or slow-down is remedied to the Owner's satisfaction in accordance with this Section. In the event of a work stoppage due to a labor dispute, the Contractor shall provide replacement labor within 24 hours of the commencement of the work stoppage. In the event of a slow-down of work due to a labor dispute, the Contractor shall provide as much supplemental labor as may be necessary to resume normal and customary progress and deadlines on the project in accordance with the time schedules established for the work. In the alternative, the Owner shall have the option to replace or supplement labor, and shall be entitled to reduce the contract sum by an amount equal to the Owner's cost of replacing or supplementing labor. If the balance of the contract sum is not sufficient to cover such amounts, the contractor shall pay the difference to the Owner. The Owner may also pursue any other remedies it may have, including, but not limited to, remedies under the performance bond and payment bond. If any labor dispute necessitates legal action or legal intervention by the Owner, or in the event that the Owner otherwise takes legal action to enforce the terms of this section, the Contractor shall be responsible for the Owner's attorney's fees and court costs, without prejudice to any other remedies that the Owner may have."

1.08 ARTICLE 9 PAYMENTS AND COMPLETION

A. § 9.3 APPLICATIONS FOR PAYMENT
   1. Add new Section 9.3.1.3 as follows:
      "§ 9.3.1.3 Until substantial completion, the Owner shall pay 90 percent of the amount due the Contractor on account of progress payments."
   2. Add new Section 9.3.2.1 as follows:
      "§ 9.3.2.1 In accordance with Section 9.3.2, the Contractor shall be permitted to make written petition to the Owner requesting payment for 75% of the cost of materials and equipment suitably stored off the site at a location agreed upon in writing between the Owner and the Contractor. In order to receive such payment, title to the materials and/or equipment must pass to the Owner; the materials and/or equipment must be stored in a protected, insured facility agreed to by the Owner, with the Owner named as an additional insured; and all storage costs and costs associated with handling and transporting the materials and/or equipment to the Project site must be paid for by the Contractor."

B. § 9.8 SUBSTANTIAL COMPLETION
   1. Delete the last sentence of Section 9.8.5 and replace with the following: "The payment shall be sufficient to increase the total payments to 95 percent of the Contract sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims."

C. § 9.10 FINAL COMPLETION AND FINAL PAYMENT
   1. Delete Section 9.10.4 in its entirety.

1.09 ARTICLE 11 INSURANCE AND BONDS

A. § 11.1 CONTRACTOR'S LIABILITY INSURANCE
   1. Where the words "the Contractor" appear throughout this Section, replace with the words "each Contractor for Contracts 1 through 8".
   2. Delete the semicolon at the end of Clause 11.1.1.1 and append the following: ", including private entities performing work at the site and exempt from the coverage on account of

number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the project;"

3. Delete the semicolon at the end of Clause 11.1.1.2 and append the following: ", or persons or entities excluded by statute from the requirements of Clause 11.1.1.1 but required by the contract documents to provide the insurance required by that clause;"
4. Delete the semicolon at the end of Clause 11.1.1.6 and append the following: ", and coverage should be written on a comprehensive automobile policy which will include coverage for owned, non-owned and hired motor vehicles."
5. Add new Section 11.1.2.1 as follows:

"§ 11.1.2.1 The insurance required by Section 11.1.1 shall be written for not less than the following limits, or greater if required by law:

1) Workers' Compensation:
   (a) State: Statutory
   (b) Applicable Federal (e.g., Longshoremen's): Statutory
   (c) Employer's Liability
      (1) $500,000.00 Per Accident
      (2) $500,000.00 Disease, Policy Limit
      (3) $500,000.00 Disease, Each Employee
2) If written under Comprehensive General Liability Policy Form (including sub-lines specified in Clause 11.1.1.8):
   (a) Bodily Injury:
      (1) $1,000,000.00 Per Occurrence
      (2) $3,000,000.00 Aggregate Per Project
   (b) Property Damage:
      (1) $1,000,000.00 Per Occurrence
      (2) $3,000,000.00 Aggregate Per Project
   (c) Bodily Injury and Property Damage combined:
      (1) $1,000,000.00 Per Occurrence
      (2) $3,000,000.00 Aggregate Per Project
   (d) Personal Injury:
      (1) $3,000,000.00 Aggregate Per Project
3) If written under Commercial General Liability Policy Form:
   (a) $3,000,000.00 General Aggregate Per Project
   (b) $1,000,000.00 Products Completed Operations Aggregate
   (c) $1,000,000.00 Personal and Advertising Injury
   (d) $1,000,000.00 Per Occurrence
   (e) $ 50,000.00 Fire Damage (any one fire)
   (f) $ 5,000.00 Medical Expense (any one person)
4) Business Automobile Liability (including owned, non-owned and hired vehicles):
   (a) Bodily Injury:
      (1) $1,000,000.00 Per Person
      (2) $3,000,000.00 Per Accident
   (b) Property Damage:
      (1) $1,000,000.00 Per Occurrence
   (c) Bodily Injury and Property Damage Combined:

(1) $1,000,000.00 Per Occurrence

5) Umbrella Excess Liability:
   (a) $2,000,000.00 over Primary Insurance
   (b) $2,000,000.00 Retention for Self-Insured Hazards Each Occurrence"

6. Add new Sections 11.1.2.2 through 11.1.2.6 as follows:

"§ 11.1.2.2 Liability insurance should be written on the comprehensive general liability basis, and shall include, but not be limited to the following sub-lines:

1) Premises and Operations including x, c, u coverages (explosion, collapse, underground).
2) Products and Completed Operations.
3) Independent Contractor's Protective.
4) Broad Form Comprehensive General Liability Endorsement:
   (a) Contractual Liability, including contractors obligation under Section 3.18.
   (b) Personal Injury & Advertising Injury Liability
   (c) Premises Medical Payments
   (d) Host Liquor Law Liability
   (e) Fire Legal Liability - Real Property
   (f) Broad Form Property Damage Liability (including completed Operations)
   (g) Incidental Medical Malpractice Liability
   (h) Non-owned Watercraft Liability
   (i) Limited Worldwide Liability
   (j) Additional Persons Insured, including employees for personal and advertising injury.
   (k) Extended Bodily Injury Liability
   (l) Automatic Coverage - Newly acquired Organizations (90 days)

§ 11.1.2.3 If liability insurance is written under the new simplified form Commercial General Liability, the above listed coverages should be included.

§ 11.1.2.4 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or retroactive date shall predate the contract; the termination date of the policy shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Section 9.10.2, and extended period endorsement "Supplemental Tail", must be purchased."

§ 11.1.2.5 All policies of insurance purchased or maintained in fulfillment of Section 11.1.1 shall name the Owner and Architect as additional insureds on a primary and noncontributory basis thereunder.

§ 11.1.2.6 The Contractor shall provide the Owner with the Original policy and shall furnish the Architect with a memorandum copy of said policy. The additional insureds on the Contractor's Liability policy shall be:

Oswego Community Unit School District 308
4175 Route 71
Oswego, Illinois 60543

KLUBER, INC.
10 S. Shumway Ave.
Batavia, Illinois 60510

7. In Section 11.1.3:
   a. In the second sentence, delete the words "Section 11.1" and replace with the words "Article 11".
   b. Append the following sentence to the end of the Section:
      "On the Certificate of Insurance, delete in the cancellation provision the following 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"."
8. Add new Section 11.1.3.1 as follows:
   "§ 11.1.3.1 Failure of the Owner to demand any certificate, policy, endorsement or other evidence of full compliance with the insurance requirements of Article 11 or failure of the Owner to identify a deficiency from evidence that is provided shall not be construed as a waiver of the Contractor's obligation to maintain such insurance. The Contractor agrees that the obligation to provide the insurance required by these documents is solely its responsibility and that this is a requirement which cannot be waived by any conduct, action, inaction or omission by the Owner."
9. Add new Section 11.1.4 as follows:
   "§ 11.1.4 Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor or any tier or either of their respective insurance carriers. The Owner, does not in any way, represent that the coverages or limits of insurance specified is sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interests or liabilities but are merely at minimums. The obligation of the Contractor, the Architect, and any Subcontractor of any tier to purchase insurance, shall not, in any way, limit their obligations to the Owner in the event the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Contractor's or any Subcontractor's insurance."

B. § 11.3 PROPERTY INSURANCE
1. In the last sentence of Section 11.3.1, after "Owner, " insert "the Architect,".
2. Delete Section 11.3.1.2. in its entirety.
3. Delete Section 11.3.1.3. in its entirety.
4. Delete Section 11.3.3 in its entirety.
5. Delete Section 11.3.5 in its entirety.
6. Delete Section 11.3.6 in its entirety.
7. Delete Section 11.3.7 in its entirety.
8. In the third sentence of Section 11.4.9 delete the phrase ", or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor.".

C. § 11.4 PERFORMANCE AND PAYMENT BOND
1. Delete Section 11.4.1 in its entirety and replace with the following:
   "§ 11.4.1 The Contractor, before commencing the Work, shall furnish a Performance Bond and a Labor and Material Bond. The Performance Bond shall be in an amount equal to 100% of the full amount of the Contract Sum as security for the faithful performance of the obligation of the Contract Documents, and the Labor and Material Payment Bond shall be in an amount equal to 100% of the full amount of the Contract Sum as security for the

payment of all persons performing labor and furnishing materials in connections with the Contract Documents. Such bonds shall be on standard AIA Documents, issued by the American Institute of Architects, shall be issued by a surety satisfactory to the Owner, and shall name the Owner as primary co-obligee.

§ 11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds shall be furnished.

§ 11.4.1.2 The Contractor shall require the attorney-in-fact who executed the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney."

2. Add new Section 11.4.3 as follows:

"§ 11.4.3 Whenever the Contractor shall be and is declared by Owner to be in default under the Contract, the Surety and the Contractor are each responsible to make full payment to the Owner or any and all extra Work incurred by the Architect as a result of the Contractor's default, and to pay to Owner all attorney's fees and court costs incurred by Owner as a result of the Contractor's default, and in protecting Owner's rights under the Agreement to remedy Contractor's default."

3. Add new Section 11.4.4 as follows:

"§ 11.4.4 The Contractor shall (i) furnish all Surety Company's bonds through Surety Company's local agents approved by and/or as directed by Owner; (ii) fully covered and guarantee with said bond the faithful performance and completion of the entire Contract, including without limitation, the faithful performance of prevailing wage requirements; and (iii) guarantee with said bond payment in all cases by the Contractor or by the Surety Company for all labor performed, material and supplies furnished with the entire Work in the Contract. Said Bond shall remain in full force and effect during the entire period of all general guarantees given by the Contractor with the Contract as called for in the Specifications and Contract, except in cases where other bonds are specifically called for in the specifications and Contract in connection with special guarantees."

D. Add new Section 11.5 as follows:

"§ 11.5 OWNERS AND CONTRACTORS PROTECTIVE LIABILITY INSURANCE

§ 11.5.1 The Contractor shall purchase and maintain Owners and Contractors Protective (OCP) liability insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract and that will protect the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work specifically pertaining to the Illinois Structural Works Act, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury or to destruction of tangible property (other than the work itself) including the loss of use resulting therefrom and (2) is cause in whole or in part by any negligent act of omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, including by assignment, regardless of whether or not it is caused in part by a party to whom insurance is afforded pursuant to this paragraph. The minimum Per Occurrence and Aggregate limits of liability purchased for such

coverage shall be equal, respectively, to the Per Occurrence and Aggregate limits required for the Contractor's Liability insurance, as listed in Section 11.1.2.1, above.
§ 11.5.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the Contractor, any other contractor assigned to the Contractor, Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the insurance obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.
§ 11.5.3 The insurance obligations of the Contractor under this Section shall not extend to the liability of the Architect, his agents or employees 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 failure to give directions or instruction by the Architect, his agents or employees provided that such giving or failure to give is the primary cause of the injury damage.
§ 11.5.4 The Contractor shall provide the Owner with the Original policy and shall furnish the Architect with a memorandum copy of said policy. The named insured on the Owners and Contractors Protective (OCP) liability policy shall be:

Oswego Community Unit School District 308
4175 Route 71
Oswego, Illinois 60175

KLUBER, INC.
10 S. Shumway Ave.
Batavia, Illinois 60510

1.10 ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

A. § 12.2.2 AFTER SUBSTANTIAL COMPLETION
1. Delete Sections 12.2.2.1, 12.2.2.2 and 12.2.2.3 in their entireties and replace with the following:

"§ 12.2.2.1 In addition ot the Contractor's obligations under Section 3.5, if, within two years after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of 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 to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the two-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

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

2. Delete Section 12.2.2.5 in its entirety and replace with the following:
   a. "§ 12.2.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two-year period for correction of Work as described in Section 12.2 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 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."

1.11 ARTICLE 13 MISCELLANEOUS PROVISIONS

A. § 13.6 INTEREST
   1. Delete Section 13.6 in its entirety. All references to interest payments throughout the Contract Documents are hereby voided.

B. Add Section 13.8 as follows:

"§ 13.8 REGULATIONS

§ 13.8.1 The Contractor or Subcontractor warrants that he is familiar with and he shall comply with Federal, State and local laws, statutes, ordinances, rules and regulations and the orders and decrees of any courts or administrative bodies or tribunals in any manner affecting the performance of the Contract including without limitation Workmen's Compensation Laws, minimum salary and wage statutes and regulations, laws with respect to permits and licenses and fees in connection therewith, laws regarding maximum working hours. No plea of misunderstanding or ignorance thereof will be considered.

§ 13.8.2 Whenever required, the Contractor or Subcontractor shall furnish the Architect and Owner with satisfactory proof of compliance with said Federal, State and local laws, statutes, ordinances, rules, regulations, orders, and decrees.

§ 13.8.3 Each bidder shall carefully examine the Occupational Safety and health Act as issued by the Federal Register (OSHA), and the specific regulations governing procedures, techniques, safety precautions, equipment design, and the configuration of the same as required under this Act and each bidder agrees as evidenced by his submission of a bid to comply with all terms of the Act and to perform and complete in a workmanlike manner all work required in full compliance with said Act.

§ 13.8.4 Each bidder agrees as evidenced by his submission of a bid to comply with all terms of the Equal Employment Opportunity Clause of the Illinois Fair Employment Practices Commission.

§ 13.8.5 At all times Contractor shall remain in compliance with the Illinois Public Works Employment Discrimination Act (775 ILCS 10/1, et seq.,) and the Illinois Human Rights Act (775 ILCS 5/2-101, et seq.,) and in addition shall at all times comply with Section 2-105 of the Illinois Human Rights Act.

§ 13.8.6 By execution of this Contract, the Contractor understands, represents and warrants to the Owner that the Contractor and its Subcontractors (for which the Subcontractor takes responsibility to insure that they comply with the above-mentioned Acts) are in compliance with all requirements provided by the Acts set forth in Article 13 and that they will remain in compliance for the entirety of the Work. A violation of any of the Acts set forth in this Article is cause for the immediate cancellation of the Contract. However, any forbearance or delay by the Owner in canceling this Contract shall not be considered as, and does not constitute, Owner's consent to such violation and a waiver of any rights the Owner may have, including without limitation, cancellation of this Contract."

C. Add Section 13.9 as follows:

"§ 13.9 PREVAILING WAGES

§ 13.9.1 Where applicable under the terms of the Illinois Prevailing Wage Act, the Contractor and each Subcontractor shall pay not less than the general prevailing rate of hourly wages for work of a similar character in the locality in which the work is performed and not less than general prevailing rate of hourly wages for legal holidays and overtime work in the performance of work under this Contract, as established by the Illinois Department of Labor. In accordance with applicable law, Contractor and each Subcontractor shall keep an accurate record showing the names and occupation of all laborers, workers and mechanics employed by them, and also showing the actual hourly wages paid to each such individual, which records shall be certified and submitted where required and in accordance with State law and which shall be open at all reasonable hours to inspection by the Owner, its officers and agents, and to agents of the Illinois Department of Labor. The Contractor and each Subcontractor hereby agree, jointly and severally, to defend, indemnify and hold harmless the Owner from any and all claims, demands, liens or suits of any kind or nature whatsoever (including suits for injunctive relief) by the Illinois Department of Labor under the Illinois Prevailing Wage Act, or by any laborer, worker or mechanic employed by this Contractor or the Subcontractor who alleges that he has been paid for his services in a sum less than prevailing wage rates required by Illinois law. The Owner agrees to notify the Contractor or Subcontractor of the pendency of any such claim, demand, lien or suit. Contractor must pay prevailing wages in effect at time labor is performed.

§ 13.9.2 The Contractor shall provide certified payroll records in accordance with the requirements established by the Prevailing Wage Act(820 ILCS 130/5) as amended 8/10/2005 by Illinois Public Act 94-0515."

1.12 ARTICLE 15 CLAIMS AND DISPUTES

A. § 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES
   1. Delete Section 15.1.6 in its entirety.

B. § 15.2 INITIAL DECISION
   1. Delete Section 15.2.1 in its entirety and replace with the following:

      "§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9 and 11.3.10, may be referred to the Initial Decision Maker for action. A decision by the Initial Decision Maker shall not be binding and shall not be required as a condition precedent to litigation."

END OF SECTION

SECTION 00 73 40
LABOR AND WAGE REQUIREMENTS

1.01 LABOR AND WAGE REQUIREMENTS

A. In the employment and use of labor, the Contractor and his subcontractors shall conform to the Illinois Statutory requirements regarding labor and wages.

B. Wage Guidelines:
   1. Prevailing Rate of Wages: All Contracts for the work herein are subject to the provisions of the Illinois Prevailing Wages Act (820 ILCS 130/et seq.) providing for the payment of prevailing rate of wages to all Laborers, Workmen, and Mechanics engaged on the work, which such provisions shall be applicable to all subcontractors and material men as well as the Contractor. The Owner may at any time inquire of the Contractor as to rates of wages being paid employees of the Contractor, any subontractor or material men, whereupon such information shall be promptly provided to the Owner.
      a. The terms "generally prevailing rate of hourly wages," "generally prevailing rate of wages," or "prevailing rate of wages," mean the hourly cash wage plus fringe benefits for health and welfare, insurance, vacations, and pensions paid generally, in the locality in which the work is being performed, to employees engaged in work of a similar character on public works.
   2. The Contractor shall not pay less than the rates of wages prevailing the District as determined by the Illinois Department of Labor to all Laborers, Mechanics and Workers performing any work under this Contract.
      a. Only such laborers, workers and mechanics as are directly employed by the Contractor or Subcontractors in actual construction work on the site of the Project, and laborers, workers and mechanics engaged in the transportation of materials and equipment to or from the site, but not in cluding the transportation by sellers and suppliers or the manufacture or processing of materials or equipment, in the execution of the Work shall be deemed to be employed on the Project for purposes of compliance with the Illinois Statutory requirements.
   3. The Contractor shall require all of its Subcontractors to comply with the requirements of the preceding paragraphs, which shall be incorporated in each and every subcontract for all or any portion of the Work.
   4. The Contractor will cooperate and coordinate his work with any subcontractors that the Owner has working on the Project at the same time.
   5. Future increases to wage rates and material cost over the course of the contract time will not be born by the Owner. Contractor to include in his Base Bid.

C. Certified Payroll Requirements: For all of the Contractor's, its Subcontractors' abd Sub-subcontractors' laborers, mechanics and other workers employed on the Project, the Contractor shall submit monthly, and with each Application For Payment, certified payroll records in accordance with State of Illinois, Department of Labor, 8/10/2005 Prevailing Wage Act Changes; "Certified Payroll Requirements" (Public Act 94-0515).

1.02 WAGE DETERMINATION SCHEDULE

A. Contact the Illinois Department of Labor for the most recent revisions to the Prevailing Rate of Wages.

END OF DOCUMENT

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: THE WHEATLANDS AND FOX CHASE SCHOOLS - HVAC RENOVATIONS.

B. Owner's Name: Oswego Community Unit School District 308.

C. Architect/Engineer's Name: Kluber Architects + Engineers.

D. The Project consists of the replacement of chillers and boilers at The Wheatlands and Fox Chase Elementary Schools, and associated incidental work.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is shown on drawings.

B. Scope of alterations work is shown on drawings.

C. Renovate the following mechanical equipment, complete including operational mechanical and electrical work:
   1. Demolish and provide new chiller at Fox Chase Elementary School.
   2. Demolish and provide new chiller and boilers at The Wheatlands Elementary Schools.
   3. Electrical service upgrades at both schools.
   4. Creation of large roof hatches above second floor mechanical rooms at both schools, for equipment access.

D. HVAC: Replace existing chillers and boilers as indicated, keeping existing systems in operation until ready for changeover.

E. Electrical Power: Alter existing system and add new construction, keeping existing in operation.

F. Contractor shall remove and store the following prior to start of work, for later reinstallation by Contractor:

1.04 WORK BY OWNER

A. Owner has awarded a contract for procurement of new chillers for both schools which were reserved by letters of intent and for which responsibility will be assigned to the awarded Contractor. The Contractor must include the value of these chillers in his Base Bid.
   1. Refer to Secion 01 21 00 - Allowances for Cash Allowances associated with the assignment of these procured chillers.
   2. Other than the value of the chillers stated in Section 01 21 00, no additional fee or payment will be awarded the Contractor for accepting assignment of these chillers. The Contractor must include all associated costs in the Base Bid.

3. Refer to Sections 01 60 00 - Product Requirements, and Section 01 70 00 - Execution and Closeout Requirements for respective Owner and Contractor responsibilities regading Owner-procured products.

1.05 FUTURE WORK

A. Project is designed for future changeout of major mechanical equipment in the second floor mechanical rooms of both schools.

B. Provide roof hatch above second floor mechanical rooms in both schools for future installation of major mechanical equipment, as well to facilitate the installation of the chillers and boilers that are part of the Work of this Contract.

1.06 OWNER OCCUPANCY

A. Owner intends to continue to occupy the existing buildings during the entire construction period.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.07 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas designated by the Owner.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Existing building spaces may not be used for storage.

E. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.
   2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
   3. Prevent accidental disruption of utility services to other facilities.

1.08 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Document 00 52 00 - Agreement Form: Contract Sum, retainages, payment period.

B. Document 00 72 00 - General Conditions and Document 00 73 00 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.

C. Document 00 73 00 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.

D. Section 01 21 00 - Allowances: Payment procedures relating to allowances.

1.03 SCHEDULE OF VALUES

A. Form to be used: AIA Form G703 - Application and Certificate for Payment Continuation Sheet.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Owner for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values to the Owner at earliest possible date, but no later than 14 days prior to first Pay Request Meeting.
   1. After review by the Owner, revise and resubmit Schedule as directed.

E. Format: Utilize the Table of Contents of this Project Manual as a format for the listing of the Work.

F. Identify as separate line items on the Schedule the costs for the following items: Bonds, Insurance, Site Mobilization, each Allowance scheduled in Section 01 21 00, Construction Submittals, General Conditions, Overhead And Profit, Demonstration And Training, and Closeout Submittals.

G. Submit Schedule of Values in sufficient detail for the Architect/Engineer to use in evaluation of Applications for Payment.
   1. Itemize the cost of the work of:
      a. Contractor's own labor forces.
      b. Subcontractors.
      c. Suppliers of products and equipment.

H. Revise Schedule of Values to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Form to be used: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Owner for approval.

D. Forms filled out by hand will not be accepted.

E. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.
   9. Balance to Finish.
   10. Retainage.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

I. Submit one pencil/draft copy of each Application for Payment the the Owner at least 7 days prior to the due date for the submission of the Application.

J. Contractor or Owner may schedule a Pay Request Meeting to review the pencil/draft copy of the Application for agreement with the progress of the Work.

K. After receipt of Architect/Engineer's review comments, submit three final copies, signed and notarized, of each Application for Payment.

L. Include the following with the application:
   1. Transmittal letter as specified for Submittals in Section 01 30 00.
   2. Construction progress schedule, revised and current as specified in Section 01 30 00.
   3. Contractor's partial waiver of lien in the amount of the Applicaiton for Payment as well as trailing partial waivers of lien for subcontractors and suppliers who were included in the previous Applicaiton for Payment, to the extent of that payment.
      a. When an Application shows completion of a subcontractor or supplier item, submit a final or full waiver for that item.
      b. Waivers of lien shall be submitted on forms and executed in a manner acceptable to the Owner.

4. Certified payroll records for the Contractor and for all Subcontractors and Sub-subcontractors employed on the Project who performed work on the Project during the Payment Period.
   a. Contractor shall assemble his and all subcontractor and sub-subcontractor records prior to submitting each Application for Payment.
   b. Applications for Payment submitted without certified payroll records or with incomplete certified payroll records will result in payment being delayed until the Contractor complies fully with the requirements set forth in the preceding paragraphs.
5. Affidavits attesting to products or equipment suitablly stored off-site in a bonded warehouse. Payments for materials stored off-site shall be conditioned upon submission of bills of sale, applicable insurance, and any other documentation or procedures satisfactory to the Owner to establish the Owner's title to such materials, or otherwise protect the Owner's interest.

M. When Owner requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.

B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Owner will issue instructions directly to Contractor.

C. For other required changes, Owner will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

D. For changes for which advance pricing is desired, Owner will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days.

E. Contractor may propose a change by submitting a request for change to Owner, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Owner for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Owner.

3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
4. For change ordered by Owner without a quotation from Contractor, the amount will be determined by Owner based on the Contractor's substantiation of costs as specified for Time and Material work.

G. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
   3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

H. Execution of Change Orders: Owner will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Sections 01 70 00.
   2. Procedures outlined in Article 9 of the General Conditions as amended.

C. The submittal of Final Waiver of Lien and the acceptance of the final payment by the Contractor shall be held to be a waiver of any and all claims against the Owner arising from, out of, or in any connection with the Contract.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

B. Contingency allowance.

1.02 RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts .

B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing. These costs are to be borne by the Contractor and are to be included in the Base Bid.

C. Owner Responsibilities:
   1. Furnish to Contractor submittals and other information on products.
   2. Be in attendance when products are delivered to the site; assist Contractor with inspection of products.

D. Contractor Responsibilities:
   1. Execute purchase agreement with designated supplier .
   2. Arrange and pay for delivery. Receive, unload, store, uncrate, handle, install, connect, and put into operation at site.
   3. Notify Owner a minimum of 48 hours prior to delivery and receipt on site.
   4. Promptly inspect products upon delivery for correctness, completeness, damage, and defects. Submit claims for transportation damage.

1.04 CONTINGENCY ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, payroll, taxes and equipment rental will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

B. Funds will be drawn from the Contingency Allowance only by Change Order.

C. Bond, insurance, overhead and profit fees on Change Orders paid out of Contingency Allowances will not be permitted. The Contractor must carry in its Base Bid OH&P costs on Contingency Allowance funds expenditures.

D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.05 ALLOWANCES SCHEDULE

A. Cash Allowance: Section 23 64 16 - Centrifugal Water Chillers: Include in the Base Bid the stipulated sum of $114,957.00 for purchase of chiller for The Wheatlands Elementary School.

B. Cash Allowance: Section 23 64 16 - Centrifugal Water Chillers: Include in the Base Bid the stipulated sum of $130,469.00 for purchase of chiller for Fox Chase Elementary School.

C. Contingency Allowance: Include in the Base Bid the stipulated sum/price of $35,000.00 for use upon Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of alternates.

B. Procedures for pricing alternates.

C. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

B. Document 00 43 23 - Bid Form Supplement - Alternates: List of Alternates as supplement to Bid Form.

C. Document 00 52 00 - Agreement Form: Incorporating monetary value of accepted Alternates.

1.03 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.04 SCHEDULE OF ALTERNATES

A. Alternate No. 1 - State the amount to be added to the Base Bid to repace The Wheatlands Elementary School's B.A.C. cooling tower model 33341KMGT-10 hp fan motor and gear box with new gear box, with no minimum speed option and variable frequency drive compatible motor and variable frequency drive with bypass. Replacement shall be performed by B.A.C. authorized service group.

B. Alternate No. 2 - State the amount to be added to the Base Bid to repace Fox Chase Elementary School's B.A.C. cooling tower model 33427GT-20 hp fan motor and gear box with new gear box, with no minimum speed option and variable frequency drive compatible motor and variable frequency drive with bypass. Replacement shall be performed by B.A.C. authorized service group.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Site mobilization meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Submittals for review, information, and project closeout.

F. Owner-provided CAD files.

G. Number of copies of submittals.

H. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Dates for applications for payment.

B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.

C. Section 01 78 00 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Award.

B. Minimum Attendance Required:
   1. Owner.
   2. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Owner.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Owner, Architect/Engineer, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. Owner will schedule a meeting at the Project site prior to Contractor occupancy. May be combined with Preconstruction Meeting

B. Minimum Attendance Required:
   1. Contractor.
   2. Owner.
   3. Contractor's Superintendent.
   4. Major Subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements .
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Security and housekeeping procedures.
   6. Schedules.
   7. Application for payment procedures.
   8. Procedures for testing.
   9. Procedures for maintaining record documents.
   10. Requirements for start-up of equipment.
   11. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Owner, Architect/Engineer, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Minimum Attendance required: Job superintendent, major Subcontractors and suppliers, Owner, as approprite to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Maintenance of quality and work standards.

11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

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

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. Within 5 days after date of the Agreement, submit preliminary schedule .

B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.

C. Submit updated schedule with each Application for Payment.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Owner for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - CLOSEOUT SUBMITTALS.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Owner's knowledge as contract administrator. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.08 OWNER-PROVIDED CAD FILES

A. After the execution of the Contract, Owner will provide, free of charge, upon receipt of a properly completed and signed request utilizing "Electronic Data Transfer Consent Form" at the end of this Specification Section, CAD files depicting graphic information for the project as follows:
   1. Architectural Floor Plans: Column grid, walls, floors, stairs, doors, windows, room numbers, ceiling grid, mechanical diffusers, plumbing fixtures, sprinkler heads (if depicted in Bid Documents) and lights.

B. Contractor acknowledges and accepts that the Architectural Floor Plans do not contain structural, mechanical, electrical, plumbing, fire protection and other building systems information depicted in the Bidding Documents. Examples of information not contained in these files include, but are not limited to, title blocks, keynotes, schedules, mechanical ductwork and equipment, electrical device symbols, circuit numbers and home runs, plumbing equipment, piping runs and riser diagrams, and architectural/engineering text or details. No other CAD files, data or information will be provided.

C. In submitting a request, Contractor acknowledges that:
   1. Owner bears no responsibility for the data or its transmission,
   2. Use of the data by the Contractor or his subcontractors in no way relieves the Contractor of his obligations under the Contract,
   3. Contractor is solely liable for any and all claims arising from any and all products generated by the Contractor or its Subcontractors employing the data,
   4. Contractor and its Subcontractors have a limited, non-exclusive license to use the data solely in connection with the Work of the Project, and that
   5. Architect/Engineer retains all rights, including copyright, to the data.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
   1. Small Size Sheets: Not Larger Than 11 x 17 inches. Submit three (3) paper copies, one of which will be retained by Owner; one of which will be retained by the Architect/Engineer. Contractor shall make his own copies from the original returned by the Owner.
      a. Contractor's Option: In lieu of paper copies specified above, submit in Adobe PDF electronic file format via email. Architect will return a reviewed copy in Adobe PDF electronic file format via email. Create PDFs at native size and right-side up; illegible files will be rejected.
   2. Large Size Sheets: Larger Than 11 x17 inches; 36 x 48 inches maximum. Submit two (3) paper copies, one of which will be retained by Owner; one of which will be retained by the Architect/Engineer. Electronic file format (PDF or other) is NOT acceptable. Contractor shall make his own copies from the original returned by the Owner.

B. Documents for Information: Submit one copy.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Owner.
   1. After review, produce duplicates.

2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

A. Transmit each submittal with a copy of approved submittal form.

B. Transmit each submittal with AIA Form G810.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Deliver submittals to Owner at 71 Stonehill Road, Oswego, IL 60543.

G. Schedule submittals to expedite the Project, and coordinate submission of related items.

H. For each submittal for review, allow 7 days excluding delivery time to and from the Contractor.

I. Clearly identify variations from the Contract Documents. Regardless of the type of variation, Contractor is solely responsible for errors in the field that arise from submittal variations from the requirements of the Contract Documents if those variations were not expressly noted to specifically identify for and describe to the reviewer the nature of the variation from the Contract Documents.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Correlate submitted items with specified products; clearly indicate the specified product that corresponds to each submitted item.

L. When options or optional features available for a Product are indicated in a submittal, and selections for those options/features are indicated in the Contract Documents, identify on the submittal the selection indicated in the Contract Documents.

M. Provide space for Contractor and Owner review stamps.

N. When revised for resubmission, using clouds, highlights or other means acceptable to the Architect, identify all changes made since previous submission. Resubmittals that do not clearly identify all changes may be delayed and/or returned to the Contractor unreviewed.

O. The Contractor is entitled to one (1) resubmittal of any Shop Drawing, Product Data, or Closeout Submittal item rejected by the Architect/Engineer or returned by the Architect/Engineer for further action. Thereafter, the Contractor shall pay the cost of all further Architect/Engineer's reviews of Shop Drawing, Product Data or Closeout Submittal, at a rate of $200.00/hour. Cost of such further reviews will be deducted from the Contract Sum by Change Order.

P. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

Q. Submittals not requested will not be recognized or processed.

R. Submittal reviews may be delayed and/or submittals may be returned unreviewed for any of the following reasons:
   1. Submittals submitted outside the scheduled dates of the Submittal Schedule.
   2. Submittals are incomplete or are missing information.
   3. Submittals are not submitted in accordance with procedures outlined in this Section (i.e. spec Section number not indicated, missing Contractor's review stamp, submitted items not correlated with specified products).

END OF SECTION

Kluber
Architects + Engineers

ELECTRONIC DATA TRANSFER CONSENT FORM

Project: THE WHEATLANDS AND FOX CHASE SCHOOLS – HVAC RENOVATIONS
2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503
260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543

Kluber Project: 14-158-901

Owner: OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308

KLUBER, INC., an Illinois corporation, is providing electronic data to you solely at your request and for your convenience. By accepting and opening any of the electronic data files, you agree that Kluber, Inc. bears no liability for the data or its transmission to you and that you are solely liable for any and all claims referring or relating to any and all products you, or your Subcontractors, may generate with the data.

You acknowledge that you have a limited non-exclusive license to use the information solely in connection with your work on the project captioned above, and that Kluber, Inc. retains all rights, including copyright, to the data.

Acknowledged by: _____ _____
(Printed Name) (Signature)

Company: _____

Date: _____ Email: _____

Architectural Floor Plans are transmitted for the contractors' use as backgrounds for shop drawings and as-built drawings, and, as such, contain graphic information for column grid, walls, floors, stairs, doors, windows, room numbers, ceiling grid, lights, receptacles, diffusers and sprinkler heads where indicated on Bid Documents. Plans do not contain title blocks, keynotes, schedules, mechanical ductwork and equipment, electrical device symbols, circuit numbers and home runs, plumbing equipment, piping runs and riser diagrams, and architectural/engineering text and details. Plans depict entire floors and are not formatted, partial plans as depicted in the Bidding Documents. Files are provided in R2000 .DWG format.)

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance submittals.

B. Control of installation.

C. Tolerances.

D. Testing services.

E. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Section 01 41 00 - Regulatory Requirements.

B. Section 01 42 00 - References.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008.

B. ASTM E329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2011.

C. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2009.

1.04 SUBMITTALS

A. Test Reports: After each test/inspection, promptly submit two copies of report to Owner and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Owner, provide interpretation of results.

B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Owner, in quantities specified for Product Data.

C. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, and adjusting, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

D. Manufacturer's Field Reports: Submit reports for Owner's benefit as contract administrator or for Owner.
   1. Submit report within 7 days of observation to Owner for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.05 TESTING AND INSPECTION AGENCIES

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

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, and ASTM C1093.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Owner before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Owner before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Owner and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Owner and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Owner.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Owner and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Owner.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Owner 30 days in advance of required observations.
   1. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Test Results: The testing agency shall report test results in writing to Owner and Contractor within 24 hours of test.

B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General.

B. Definitions.

C. Quality Assurance.

D. Regulatory Requirements.

1.02 RELATED SECTIONS

A. Section 01 10 00 - Summary.

B. Section 01 42 00 - References.

1.03 GENERAL

A. Comply with all applicable laws, rules, regulations, codes and ordinances.

B. If the Contractor observes that the Contract Documents may be at variance with specified codes, notify the Owner immediately. Owner shall issue all changes in accordance with the General Conditions.

C. It shall not be the Contractor's primary responsibility to make certain that the Contract Documents are in accordance with all applicable laws, rules and regulations, however, when the Contractor performs work knowing or having reason to know that the work in question is contrary to applicable laws, rules, and regulations, and fails to notify the Owner, the Contractor shall pay all costs arising therefrom.

1.04 DEFINITIONS

A. Definitions:
   1. Codes: Codes are statutory requirements, rules or regulations of governmental entities.
   2. Standards: Standards are requirements that have been established as accepted criteria, set general consent.

1.05 QUALITY ASSURANCE

A. The Architect/Engineer has designed the project to applicable code requirements and has copies of said codes available for the Contractor's inspection.

B. The Contractor shall:
   1. Ensure that copies of codes and standards referenced herein or specified in individual specifications sections are available to Contractor's personnel, agents, and Sub-Contractors.
   2. Ensure that Contractor's personnel, agents, and Sub-Contractors are familiar with the workmanship and requirements of applicable codes and standards.

1.06 REGULATORY REQUIREMENTS

A. Source and Requirements: Verify amendments with local code officials.
   1. Local code requirements:
      a. ICC International Building Code, 2009 Edition.
      b. ICC International Mechanical Code, 2009 Edition.
      c. ICC International Fire Code, 2009 Edition.
      d. ICC International Property Maintenance Code, 2009 Edition.
      e. National Electrical Code, 2008 Edition.
   2. State code requirements:
      a. Illinois Department of Public Health (IDPH):
         1) Illinois Plumbing Code (Illinois Administrative Code, Title 77, Chapter I, Subchapter r, Part 890).
      b. Illinois Environmental Protection Agency (IEPA):
         1) Air-Pollution Standards.
         2) Noise Pollution Standards.
         3) Water Pollution Standards.
         4) Public Water Supplies
         5) Solid Waste Standards.
         6) Illinois Recommended Standards for Sewerage Work.
      c. Illinois State Fire Marshal (OSFM):
         1) Boiler & Pressure Vessel Safety Code (Illinois Administrative Code, Title 44, Chapter I, Part 120).
         2) Illinois Rules & Regulations for Fire Prevention & Safety (as amended).
         3) Gasoline and Volatile Oils (Illinois Revised Statutes, chap. 17 1/2, paragraph 31, et seq.).
   3. Information and Requirements for Utility Services: Local utility companies.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 42 00
REFERENCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Drawing symbols, abbreviations and acronyms.

B. Definitions of terms used throughout the Contract Documents.

C. Explanation of specification format and content.

D. Requirements relating to referenced standards.

E. Applicability of referenced standards.

F. List of industry organizations and certain of their respective documents.

1.02 DRAWING SYMBOLS AND CONVENTIONS

A. Abbreviations and graphic symbols are defined on the General Notes, Symbols & Abbreviations sheet of the drawings.

B. Generally, symbols used on the mechanical and electrical drawings conform to those recommended by ASHRAE, though, where appropriate, these symbols are supplemented by more specific symbols as recommended by ASME, ASPE, or the IEEE.

1.03 DEFINITIONS

A. Where the terms "indicated", "noted", "scheduled", "shown", or "specified" are used it is to help locate the reference; no limitation on location is intended except as specifically noted.

B. Where the terms "directed", "requested", "authorized", "approved", are used as in "directed by the Owner", no implied meaning shall be construed to extend the Owner's or Architect/Engineer's responsibilities into the Contractor's purview of construction supervision.

C. Where the term "approved" is used in conjunction with the Owner's action on submittals, requests or applications it is limited to the duties of the Owner as described in the Agreement, and the General and Supplemental Conditions of the Contract. Such use of the term "approval" shall not limit or release the Contractor from his responsibility to fulfill Contract requirements.

D. Where the term "regulations" is used it means all applicable statutes, laws, ordinances, and orders issued by authorities having jurisdiction, as well as construction industry standards, rules, or conventions that address performance of the Work.

E. Where the term "furnish" is used it means supply, deliver, and unload to the construction site ready for assembly and incorporation into the Work.

F. Where the term "install" is used it is meant to describe operations at the job site to include unloading, assembling, placing, anchoring, finishing, protecting, cleaning and all other similar operations required to fully incorporate an item into the Work.

G. Where the term “provide” is used it means “furnish and install” as defined above.

H. The "Project Site" is the space available to the Contractor for performance of construction activities. The Project Site may be for the exclusive use of the Contractor and his activities or may be used in conjunction with others with others performing other construction or related activities on the Project. The Extent of the Project Site is indicated on the drawings.

1.04 SPECIFICATION FORMAT AND CONTENT

A. These Specifications are based on the Construction Specification Institute's 49 Division format and numbering system.

B. Language used in the Specifications and other Contract Documents is an abbreviated type. Implied words and meanings will appropriately interpreted.

C. Requirements expressed in imperative and streamlined language are to be performed by the Contractor. At certain locations in the text, subjective language may be used to describe responsibilities that must be fulfilled indirectly by the Contractor or others.
   1. Whenever a colon (:) us used within a sentence or phrase, it shall be construed to mean the words "shall be".

D. Use of certain terms such as "carpentry" is not intended to imply that certain activities must be performed by accredited or unionized individuals of a corresponding generic name. The Specifications do, however, require that certain construction activities shall be performed by specialists who are recognized experts in the operations to be performed. Specialists shall be used for said activities, however the final responsibility for fulfilling the requirements of the Contract remains the Contractor's.

1.05 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.

C. Obtain copies of standards when required by the Contract Documents.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from the Owner before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Owner shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

1.06 APPLICABILITY OF INDUSTRY STANDARDS

A. Construction industry standards shall have the same force and effect as if bound or copied directly in the Contract Documents, except where more stringent requirements are specified. All such applicable standards are made a part of the Contract Documents by reference.

1. Where compliance with two or more standards are referenced and conflicting requirements for quality or quantities occur, comply with the more stringent requirements. Refer questions regarding apparently conflicting standards to the Architect for a decision before proceeding.
2. The standard of quality or quantity levels specified, shown, or referenced shall be the minimum to be provided or performed. Refer questions regarding standards of minimum quality or quantity to the Architect before proceeding.

1.07 CONSTRUCTION INDUSTRY ORGANIZATIONS AND DOCUMENTS

A. AA -- ALUMINUM ASSOCIATION, INC.

B. AABC -- ASSOCIATED AIR BALANCE COUNCIL

C. AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

D. ACI -- AMERICAN CONCRETE INSTITUTE INTERNATIONAL

E. AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

F. ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE

G. ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

H. ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
   1. ASME A17.1 - Safety Code for Elevators and Escalators; 2004.

I. ASTM -- AMERICAN SOCIETY FOR TESTING AND MATERIALS

J. AWS -- AMERICAN WELDING SOCIETY

K. CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION

L. FM -- FACTORY MUTUAL RESEARCH CORPORATION

M. ICC -- INTERNATIONAL CODE COUNCIL, INC.

N. IEEE -- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS

O. ISO -- INTERNATIONAL STANDARDS ORGANIZATION

P. NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS

Q. NEBB -- NATIONAL ENVIRONMENTAL BALANCING BUREAU

R. NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

S. NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

T. NRCA -- NATIONAL ROOFING CONTRACTORS ASSOCIATION

U. SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

V. SSPC -- THE SOCIETY FOR PROTECTIVE COATINGS

W. UL -- UNDERWRITERS LABORATORIES INC.

X. WWPA -- WESTERN WOOD PRODUCTS ASSOCIATION

1.08 UNITED STATES GOVERNMENT AND RELATED AGENCIES/DOCUMENTS

A. CFR -- CODE OF FEDERAL REGULATIONS

B. CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION

C. EPA -- ENVIRONMENTAL PROTECTION AGENCY

D. FS -- FEDERAL SPECIFICATIONS AND STANDARDS (General Services Administration)

E. GSA -- U.S. GENERAL SERVICES ADMINISTRATION

F. USGS -- UNITED STATES GEOLOGICAL SURVEY

1.09 STATE GOVERNMENT AND RELATED AGENCIES/DOCUMENTS

A. CDB -- ILLINOIS CAPITAL DEVELOPMENT BOARD

B. IDOL -- ILLINOIS DEPARTMENT OF LABOR

C. IDPH -- ILLINOIS DEPARTMENT OF PUBLIC HEALTH

D. IEPA -- ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

E. OSFM -- OFFICE OF THE ILLINOIS STATE FIRE MARSHAL.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES

A. Owner will provide the following:
   1. Electrical power and metering, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.

B. Existing facilities may be used.

C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. One (1) mobile cellular telephone for each of Contractor's and any Subcontractor's field personnel.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities located at each school is not permitted.

C. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way .

C. Provide protection for plants and turf. Replace damaged plants and turf.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction staging areas; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to provide temporary weather protection for interior spaces, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

C. All on-site personnel of Contractor, Subcontractors and Suppliers must pass a background check, performed by the District through Raptor Technologies' online database.
   1. Contractor's Responsibility: At least 7 days prior to a Contractor, Subcontractor or Supplier employee working on site, provide Owner with employee's full legal name and date of birth.
   2. Await Owner's background check and approval prior to allowing employee to come to the jobsite.

1.09 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Designated existing on-site roads may be used for construction traffic.

E. Existing parking areas designated by Owner located at each school may be used for construction parking.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Procedures for Owner-procured products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

B. Section 01 10 00 - Summary: Lists of products to be removed from existing building.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Designed, manufactured, and tested in accordance with industry standards.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site and place in location directed by Owner's representative; obtain Owner's signature on receipt for delivery prior to final payment. Submit signed receipts with Closeout Submittals.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Substitutions Prior To Bid Opening: Owner will consider a written request for substitution provided that such request is received at least 3 days prior to the Bid opening date. Requests received after that time will not be considered. If a request is approved, the Owner will issue and appropriate addendum not less than 2 days prior to the Bid opening date.

B. Substitutions After Notice of Award: Owner will consider a request for substitution only under one or more of the following conditions:
   1. Substitution is required for compliance with final interpretation of code requirements or insurance regulations.
   2. Specified product is not available through no fault of the Contractor.
   3. Specified product is not compatible with other specified materials/equipment.
   4. Manufacturer will not certify or warranty specified product as required.

C. Document each request utilizing Substitution Request Form following this section with complete data substantiating compliance of proposed substitution with Contract Documents. Incomplete requests will not be considered.

D. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will reimburse Owner for Owner review or redesign services associated with re-approval by authorities having jurisdiction over the Project.

E. Substitutions of products or product characteristics/components/accessories will not be considered when they are indicated or implied on Contractor's submittals, without separate written request, or when acceptance will require revision to the Contract Documents, whether rejection of said subsititutions is expressly identified by Owner on Contractor's submittals or not.

F. Substitution Submittal Procedure:
   1. Submit two copies of request for substitution for consideration. Submit a separate Substitution Request Form and accompanying documentation for each proposed substitution.
   2. Provide the following minimum documentation with each Substitution Request Form:
      a. Product identification, manufacturer, product data including dimensions and weight, performance and installation instructions.
      b. Side-by-side itemized comparison of proposed substitution with specified product.
      c. Coordination information including other modifications required as a result of proposed substitution.
      d. Cost information including the effect of the proposed substitution on the Contract Sum.
   3. Sign and date the Substitution Request Form.
   4. Owner will notify submitter in writing of decision to accept or reject request.

3.02 OWNER-PROCURED PRODUCTS

A. See Section 01 10 00 - Summary for identification of Owner-procured products.

B. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. On delivery, inspect products jointly with Contractor.

C. Contractor's Responsibilities:
   1. Accept assignment of Owner-procured product contracts.
   2. Review Owner reviewed shop drawings, product data, and samples.
   3. Arrange and pay for product delivery to site.
   4. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   5. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   6. Handle, store, install and finish products.
   7. Repair or replace items damaged after receipt.
   8. Make final connections to Owner-procured equipment, and test equipment.
   9. Arrange for manufacturers' warranties, inspections, and service.

3.03 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

E. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Prevent contact with material that may cause corrosion, discoloration, or staining.

I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: _____

PROJECT: _____

SPECIFIED ITEM:

Section	Page	Paragraph	Description
_____	_____	_____	_____

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

_____

Attached data includes project description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents which the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. The proposed substitution does not affect dimensions shown on drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailings, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

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

Signature _____ For use by the design consultant

Firm _____ [ ] Accepted [ ] Accepted as noted

Address _____ [ ] Not Accepted [ ] Received too late

_____ By: _____

Date _____ Date _____

Telephone _____ Remarks _____

Attachments:

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, except payment procedures.

I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; Owner-procured products.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures.

C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

D. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

F. Section 07 84 00 - Firestopping.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:

a. Identification of Project.
b. Location and description of affected work.
c. Necessity for cutting or alteration.
d. Description of proposed work and products to be used.
e. Alternatives to cutting and patching.
f. Effect on work of Owner or separate Contractor.
g. Written permission of affected separate Contractor.
h. Date and time work will be executed.

C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas , conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Substantial Completion, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

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

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Owner four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

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

3.04 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and original construction documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Owner before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. See Section 01 10 00 for other limitations on outages and required notifications.
      c. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

E. Protect existing work to remain.
   1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   2. Repair adjacent construction and finishes damaged during removal work.

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

H. Clean existing systems and equipment.

I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

J. Do not begin new construction in alterations areas before demolition is complete.

K. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.

4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

E. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

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

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. See Section 01 79 00 - Demonstration and Training.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93.

3.12 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Owner.

B. Notify Owner when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Owner's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

E. Notify Owner when work is considered finally complete.

F. Complete items of work determined by Owner's final inspection.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

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

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Owner with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Owner will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Owner comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.

2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
2. Field changes of dimension and detail.
3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

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

3.05 EQUIPMENT INVENTORY INFORMATION

A. Provide in electronic spreadsheet (Microsoft Excel or equivalent) format and equipmentinventory of all mechanical, electrical, plumbing and food service equipment items. The following information is required for each item:
   1. Description.
   2. Location (i.e. room number).
   3. Make (Brand name).
   4. Model Number.
   5. Serial Number.
   6. Motor Information.
   7. Voltage Information.
   8. Filters:
      a. Size.
      b. Quantity.
   9. Start-Up Date.
   10. Service Requirements.
   11. For Service Call:
      a. Firm Name.
      b. Contact Name.
      c. Telephone Number.
      d. Facsimile Number.
      e. Email Address.
   12. Lamps:
      a. Model Number.
      b. Quantity.

3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Owner, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

L. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Product data, shop drawings, and other submittals.
      c. Operation and maintenance data.
      d. Field quality control data.
      e. Photocopies of warranties and bonds.

3.07 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:
   1. All software-operated systems.
   2. HVAC systems and equipment.
   3. Electrical systems and equipment.
   4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

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

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

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.

3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
   1. Format: DVD Disc.
   2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstration may be combined with Owner personnel training if applicable.

C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two hour segments.

D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventive maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.
   8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
   9. Review recommended tools and spare parts inventory suggestions of manufacturers.
   10. Review spare parts and tools required to be furnished by Contractor.
   11. Review spare parts suppliers and sources and procurement procedures.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Miscellaneous concrete elements, including equipment pads.

B. Concrete curing.

1.02 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

C. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (errata 2007).

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.

J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Billet-Steel Bars for Concrete Reinforcement; 2013.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2013.

M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2013.

O. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

P. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

R. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

S. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2013.

T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

U. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2012.

V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2013.

W. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999 (Reapproved 2008).

X. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).

Y. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
   2. Anchoring epoxy and expansion anchors.

C. Mix Design: Submit 15 days prior to start of work.
   1. Include back-up test data.
   2. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   3. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

1.04 QUALITY ASSURANCE

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

B. Acquire cement from same source and aggregate from same source for entire project.

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

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

PART 2 PRODUCTS

2.01 FORMWORK

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

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

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

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C 33.

C. Lightweight Aggregate: ASTM C330/C330M.

D. Fly Ash: ASTM C618, Class C.

E. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Accelerating Admixture: ASTM C494/C494M Type C.

G. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Anchoring Epoxy: Refer to drawings. Acceptable manufacturer's include...
   1. Hilti: HIT-HY-150 fast curing injection system.

2. Simpson Strong-Tie: SET-XP high-strength anchoring adhesive.
3. Powers Fasteners: Pure110+ epoxy injection adhesive anchoring system.

B. Expansion Anchors: Refer to drawings. Acceptable manufacturer's include:
1. Hilti: Kwik Bolt 3 expansion anchor.
2. Simpson Strong-Tie: Strong-Bolt 2 wedge anchor.

C. Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.

D. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059 Type II.

B. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.

2.07 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309.

B. Moisture-Retaining Sheet: ASTM C171.
1. Curing paper, regular.
2. Polyethylene film, clear, minimum nominal thickness of 0.0040 in.
3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.

C. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
1. For trial mixtures method, employ independent testing agency acceptable to Owner for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer. Submit to Architect for review and approval.

D. Normal Weight Concrete: Type "A".
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi.
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 48 percent by weight.
4. Total Air Content: 2 percent, determined in accordance with ASTM C 173/C 173M.
5. Maximum Slump: 4 inches.
6. Maximum Aggregate Size: 3/4 inch.

2.09 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Notify Owner not less than 24 hours prior to commencement of placement operations.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement will not be disturbed during concrete placement.

3.05 CONCRETE FINISHING

A. Repair surface defects, immediately after removing formwork.

B. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
   2. Provide 3/4" radiused edge on exposed slab edges, unless otherwise noted.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      a. Spraying: Spray water over floor slab areas and maintain wet.
      b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
   2. Final Curing: Begin after initial curing but before surface is dry.
      a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
      b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.07 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Owner. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Owner for each individual area.

3.08 PROTECTION

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

3.09 SCHEDULE - CONCRETE TYPES AND FINISHES

Location	Mix Type	Concrete Finish
A. Equipment pads: Interior	A	sides: smooth form; top non-slip

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof-mounted curbs.

B. Fire retardant treated wood materials.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

D. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.

E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

F. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.03 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER

A. Grading Agency: Western Wood Products Association (WWPA).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Roof Curb Blocking and Roof Hatch Framing (2 by 6 through 4 by 16):
   1. Species: Hem-Fir or Spruce-Pine-Fir.
   2. Grade: No. 2.

2.03 STRUCTURAL COMPOSITE LUMBER

A. At Contractor's option, structural composite lumber may be substituted for concealed dimension lumber and timbers.

B. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.

2.04 CONSTRUCTION PANELS

A. Roof Sheathing: APA PS 1-09, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
   1. Thickness: 3/4 inch, nominal.

B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.05 ACCESSORIES

A. Fasteners, Anchors and Lifting Lugs:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M.

2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

B. Fire Retardant Treatment:
   1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 ROOF-RELATED CARPENTRY

A. Coordinate construction of roof cubs with demolition work to create roof opening.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.03 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges use sheathing clips where joints occur between roof framing members.
   2. Screw panels to framing; nails and staples are not permitted.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.

3.04 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.05 CLEANING

A. Waste Disposal:

B. Do not leave any wood, shavings, sawdust, etc. on the ground.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

3.06 SCHEDULES

A. Roof Curb Blocking and Roof Hatch Framing and Sheathing: Fire retardant treated.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, adhered conventional application.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Deck sheathing.

E. Flashings.

1.02 REFERENCE STANDARDS

A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a (Reapproved 2013).

D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).

E. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2013.

F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).

G. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2013.

H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.

I. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.

J. FM 1-29 - Property Loss Prevention Data Sheet - Roof Deck Securement and Above-Deck Roof Components, May 2005 edition.

K. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

L. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.

D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions, special procedures, and perimeter conditions requiring special attention.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience, and approved by manufacturer.

D. Applicator Qualifications: Company specializing in performing the work of this section with minimum ten years experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.06 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

C. Provide manufacturer's standard ten (10) year "total roof system" material and labor warranty to cover failure to prevent penetration of water. Include entire roof system, from top of roof decking to top of roofing membrane, including associated metal flashings and counterflashings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com.
   2. Firestone Building Products, LLC: www.firestonebpco.com.
   3. Substitutions: Not permitted.

B. Insulation:
   1. Same manufacturer as Membrane Materials, for inclusion in total system warranty.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire-Resistance Classification: UL Class A.
   2. Factory Mutual Classification: Class I and windstorm resistance of I-90, in accordance with FM DS 1-28.
   3. Securement of Roofing Components: As prescribed in FM 1-29, May 2005 edition.

C. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
   1. Minimum 2 layers of polyisocyanurate board.

D. Acceptable Insulation Types - Tapered Application: Any of the types specified.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D4637.
   1. Thickness: 0.060 inch.
   2. Sheet Width: 240 inch, minimum; factory-fabricate into largest sheets possible.
   3. Color: Black.
   4. Tensile Strength: 1,300 psi, measured in accordance with ASTM D412.
   5. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
   6. Hardness: 65 +/-10, measured in accordance with ASTM D2240, using Type A durometer.
   7. Tear Strength: 150 lbf/in, measured in accordance with ASTM D624.
   8. Water Vapor Permeability: 2.0 perm inch, measured in accordance with ASTM E96/E96M.
   9. Brittleness Temperature: -49 deg F., measured in accordance with ASTM D746.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Retarder: Plastic complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.

2. Vapor permeability: Not more than 0.06 perms, measured in accordance with ASTM E 96/E 96M.

D. Flexible Flashing Material: Same material as membrane.

2.04 COVER BOARDS

A. Cover Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire-resistant type, 1/2 inch thick.

2.05 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, non-asphaltic fiberglass mat on both faces and with the following characteristics:
   1. Board Size: 48 x 96 inch.
   2. Board Thickness: 2.0 inch.
   3. Long-Term Thermal Resistance: R-value of 6.0 per inch thickness.
   4. Board Edges: Square.

2.06 ACCESSORIES

A. Roofing Expansion Joint Flashing: Same material as membrane.

B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

C. Insulation Adhesive: Low-rise polyurethane foam type; approved by insulation manufacturer.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

F. Insulation Adhesive: As recommended by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 WOOD DECK PREPARATION

A. Verify flatness and tightness of joints of wood decking. Fill knot holes with latex filler.

B. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.03 INSULATION - UNDER MEMBRANE

A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation: Embed insulation in adhesive in full contact, in accordance with roofing and insulation manufacturers' instructions.

D. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

F. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

G. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

H. Do not apply more insulation than can be covered with membrane in same day.

3.04 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane up/down a minimum of 6 inches onto vertical surfaces.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of associated counterflashings installed under other sections.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.06 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

C. Smoke-stopping of all penetrations of and joints in smoke partitions, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.

B. FM 4991 - Approval of Firestop Contractors; Factory Mutual Research Corporation; 2001.

C. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.03 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time rated fire walls, smoke barrier walls, time rated ceiling/floor assemblies and structural floors.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire gasses and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. Joint: Interruption to a fire-rated assembly occurring at interface between 1) adjacent sections of wall, 2) intersecting walls, 3) top of wall and ceiling, structural floor or roof deck, 4) wall and edge of structural floor, 5) adjacent sections of structural floor.

F. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations and joints.

G. Sleeve: Metal fabrication or pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.04 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
   1. Provide manufacturer's qualified engineering judgements for non-standard applicaitons.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL will be considered as constituting an acceptable test report.
   2. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors .
   2. With minimum 3 years documented experience installing work of this type.
   3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
   4. Licensed by authority having jurisdiction.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original, unopened packaging with legible manufacturer’s identification.

B. Coordinate delivery with scheduled installation date to minimize storage time at site.

C. Store materials in a clean, dry, ventilated location. Protect materials from freezing if required by manufacturer.

1.08 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.02 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

B. Accepatable Manufacturers: As listed in UL (FRD) for specific UL Design Number.

C. Fill, Void or Cavity Materials: Conform to UL (FRD) - XHHW.

D. Firestop Devices: Conform to UL (FRD) - XHJI.

E. Forming Materials: Conform to UL (FRD) - XHKU.

F. Mechanical Joint Assemblies: Conform to UL (FRD) - XHLP.

G. Packing Material: As required by specific UL Design Number for joint system or through-penetration firestop system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.
   1. Verify barrier joints and penetrations are properly sized and in suitable condition for application of materials.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in UL (FRD) or fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

B. Patch or replace firestopping damaged by work of other sections.

END OF SECTION

SECTION 07 90 05
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint sealants and joint backing.

1.02 REFERENCE STANDARDS

A. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

B. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.04 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics.

B. Samples: Submit samples, 2 inch in size illustrating sealant colors for selection.

C. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience and approved by manufacturer.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gunnable and Pourable Sealants:
   1. Bondaflex Technologies: www.bondaflex.com.
   2. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   3. Dow Corning Corporation: www.dowcorning.com.
   4. Pecora Corporation: www.pecora.com.

5. Tremco Global Sealants: www.tremcosealants.com.

2.02 JOINT SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type S-1 - Silicone; single-component, non-sagging, moisture-curing, non-staining, non-bleeding, fungus-resistant.
   1. ASTM C 920, Type S, Grade NS, Class 25, Uses NT, M, G, A and O.
   2. Movement Capability: Plus and minus 25 percent.
   3. Service Temperature Range: -50 to 450 degrees F.
   4. Shore A Hardness Range: 25.
   5. Color: As selected from manufacturer's standard colors.
   6. Product:
      a. OmniPlus, manufactured by BASF.
      b. Spectrem 1, manufactured by Tremco.
      c. Spectrem 2, manufactured by Tremco.
      d. Spectrem 3, manufactured by Tremco.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM C 1330, Type C, closed cell polyethylene; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 22 10 05
PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.
   1. Gas.

1.02 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

B. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2011 (ANSI/ASME B31.9).

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

D. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

E. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2011.

F. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2012.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: NFPA 54, threaded or welded to ASME B31.1.

2.02 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch:
   1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

2.03 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.

B. Plumbing Piping - Gas:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

2.04 BALL VALVES

A. Manufacturers:
   1. Kitz Corporation of America.
   2. Conbraco Industries.
   3. Nibco, Inc.
   4. Milwaukee Valve Company.

2.05 PLUG VALVES

A. Manufacturers:

B. Up to and including 2 Inches (50 mm): bronze body, bronze tapered plug, non-lubricated, teflon packing, screwed ends.

C. Construction 2-1/2 Inches and Larger: MSS SP-78, 175 psi CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged ends. Provide lever operator with set screw.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

G. Sleeve pipes passing through partitions, walls and floors.

H. Provide sleeve and watertight mechanical seal on all wall penetration.

I. Pipe Hangers and Supports:
   1. Support horizontal piping as scheduled.
   2. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   3. Place hangers within 12 inches of each horizontal elbow.
   4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   6. Support cast iron drainage piping at every joint.

3.03 APPLICATION

A. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

B. Provide plug valves in natural gas systems for shut-off service.

3.04 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches to 1-1/4 inches:
         1) Maximum hanger spacing: 6.5 ft.
         2) Hanger rod diameter: 3/8 inches.
      b. Pipe size: 1-1/2 inches to 2 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 3/8 inch.

END OF SECTION

SECTION 23 05 19
METERS AND GAGES FOR HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pressure gages and pressure gage taps.

B. Thermometers and thermometer wells.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

1.03 REFERENCE STANDARDS

A. ASME B40.100 - Pressure Gauges and Gauge Attachments; The American Society of Mechanical Engineers; 2013.

B. ASTM E1 - Standard Specification for ASTM Thermometers; 2013.

C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2007.

D. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

C. Project Record Documents: Record actual locations of components and instrumentation.

1.05 FIELD CONDITIONS

A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

2.01 PRESSURE GAGES

A. Manufacturers:
   1. Dwyer Instruments, Inc.
   2. Moeller Instrument Co., Inc.
   3. Omega Engineering, Inc.

B. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
   1. Case: Steel with brass bourdon tube.
   2. Size: 4-1/2 inch diameter.
   3. Mid-Scale Accuracy: One percent.

4. Scale: Psi.

2.02 PRESSURE GAGE TAPPINGS

A. Gage Cock: Tee or lever handle, brass for maximum 150 psi.

B. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.

2.03 STEM TYPE THERMOMETERS

A. Manufacturers:
   1. Dwyer Instruments, Inc.
   2. Omega Engineering, Inc.
   3. Weksler Glass Thermometer Corp.

B. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
   1. Size: 9 inch scale.
   2. Window: Clear Lexan.
   3. Stem: 3/4 inch NPT brass.
   4. Accuracy: 2 percent, per ASTM E77.
   5. Calibration: Degrees F.

2.04 TEST PLUGS

A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.

C. Install pressure gages with pulsation dampers. Provide gage cock to isolate each gage. Extend nipples to allow clearance from insulation.

D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

F. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

G. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe Markers.

1.02 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2001 (Reapproved 2007).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 NAMEPLATES

A. Manufacturers:
   1. Kolbi Pipe Marker Co..
   2. Seton Identification Products.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 TAGS

A. Manufacturers:
   1. Brady Corporation.
   2. Kolbi Pipe Marker Co..
   3. Seton Identification Products.

B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.03 PIPE MARKERS

A. Manufacturers:
   1. Brady Corporation.
   2. Kolbi Pipe Marker Co..

3. Seton Identification Products.

B. Color: Conform to ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Use tags on piping 3/4 inch diameter and smaller.

F. Identify pipe service, flow direction, and pressure.

G. Install pipe markers in clear view and align with axis of piping.

H. Location of pipe identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic systems.

C. Measurement of final operating condition of HVAC systems.

1.02 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.

B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2008.

C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; National Environmental Balancing Bureau; 2005, Seventh Edition.

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Contractors' National Association; 2002.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      d. Final test report forms to be used.
      e. Procedures for formal deficiency reports, including scope, frequency and distribution.

C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Revise TAB plan to reflect actual procedures and submit as part of final report.

2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Owner and for inclusion in operating and maintenance manuals.
3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
6. Include the following on the title page of each report:
   a. Name of Testing, Adjusting, and Balancing Agency.
   b. Address of Testing, Adjusting, and Balancing Agency.
   c. Telephone number of Testing, Adjusting, and Balancing Agency.
   d. Project name.
   e. Project location.
   f. Project Owner.
   g. Project Engineer.
   h. Project Contractor.
   i. Report date.

E. Project Record Documents: Record actual locations of balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
   1. AABC MN-1, AABC National Standards for Total System Balance.
   2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
   3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
   4. SMACNA HVAC Systems Testing, Adjusting, and Balancing.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Having minimum of three years documented experience.
   3. Certified by one of the following:
      a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.
      b. NEBB, National Environmental Balancing Bureau: www.nebb.org.
      c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Duct systems are clean of debris.
   5. Fans are rotating correctly.
   6. Duct system leakage is minimized.
   7. Hydronic systems are flushed, filled, and vented.
   8. Pumps are rotating correctly.
   9. Proper strainer baskets are clean and in place.
   10. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Owner to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. Check and adjust systems approximately six months after final acceptance and submit report.

3.06 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

3.07 WATER SYSTEM PROCEDURE

A. Adjust water systems to provide required or design quantities.

B. Use calibrated fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

D. Effect system balance with automatic control valves fully open to heat transfer elements.

E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

3.08 SCOPE

A. Test, adjust, and balance the following:
   1. HVAC Pumps
   2. Packaged Steel Fire Tube Boilers
   3. Centrifugal Water Chillers
   4. Induced Draft Cooling Tower
   5. Fans

END OF SECTION

SECTION 23 07 13
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

B. ASTM C553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.

E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.03 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of experience and approved by manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.05 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:
   1. Knauf Fiber Glass.
   2. Johns Manville Corporation.
   3. Owens Corning Corp.
   4. CertainTeed Corporation.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. 'K' value: 0.25 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum Service Temperature: 850 degrees F.
   3. Maximum Water Vapor Sorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.04 perm inch, when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

E. Tie Wire: Annealed steel, 16 gage.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Insulated ducts conveying air above ambient temperature:
   1. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E. External Duct Insulation Application:
   1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.

2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.03 SCHEDULES

A. Combustion Air Duct:
   1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

B. Exhaust Ducts Within 10 ft of Exterior Openings:
   1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2013.

B. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.

E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 GLASS FIBER

A. Manufacturers:
   1. Knauf Insulation.
   2. Johns Manville Corporation.
   3. Owens Corning Corp.
   4. CertainTeed Corporation.

B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 650 degrees F.
   3. Maximum moisture absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive:
   1. Compatible with insulation.

2.03 JACKETS

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.
   2. Covering Adhesive Mastic:
      a. Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.
   4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

3.03 SCHEDULE

A. Heating Systems:
   1. Heating Water Supply and Return:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: All sizes.
            (a) Thickness: 1-1/2 inch

B. Cooling Systems:
   1. Chilled Water:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: All sizes.

(a) Thickness: 1-1/2 inch

2. Dual Temperature Water:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: All sizes.
         (a) Thickness: 1-1/2 inch.

END OF SECTION

SECTION 23 09 13
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Variable frequency drives.

B. Refrigerant detection system.

C. Miscellaneous accessories.

D. Rough-in, wiring to, and final connections to products specified in this Section.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gage taps.

B. Section 23 09 23 - Direct-Digital Control System for HVAC.

C. Section 26 05 35 - Raceways and Boxes: Requirements for conduit rough-in for products specified in this Section.

D. Section 26 06 20.26 - Wiring Connections: Electrical characteristics and requirements for wiring and final connections to products specified in this Section.

E.

1.03 REFERENCE STANDARDS

A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2008.

B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association; 2012.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

D. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
   1. Revise shop drawings to reflect actual installation and operating sequences.

E. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience approved by manufacturer.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gages, pilot lights, push buttons and switches flush on cabinet panel face.

B. NEMA 250, general purpose utility enclosures with enamelled finished face panel.

C. Provide common keying for all panels.

2.03 INPUT/OUTPUT SENSORS

A. Temperature Sensors:
   1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
   2. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
   3. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
   4. Temperature sensing device must be compatible with project DDC controllers.
   5. Performance Characteristics:
      a. RTD:
         1) Chilled Water Accuracy: Plus/minus 0.5 degrees F minimum.
         2) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
         3) Range: Minus 40 degrees F through 220 degrees F minimum.
      b. Thermistor:
         1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
         2) Range: Minus 30 degrees F through 230 degrees F minimum.
         3) Heat Dissipation Constant: 2.7 mW per degree C.
      c. Temperature Transmitter:
         1) Accuracy: 0.10 degree F minimum or plus/minus 0.20 percent of span.

2) Output: 4 - 20 mA.

d. Sensing Range:
   1) Provide limited range sensors if required to sense the range expected for a respective point.
   2) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.

e. Wire Resistance:
   1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.
   2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.

B. Equipment Operation Sensors:
   1. Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi.
   2. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

2.04 LOW COIL INPUT RELAYS

A. Manufacturers
   1. Functional Devices, Inc.; RIB.

B. Enclosed relay Hi/Low separation 20 amp DPDT +Override.

C. UL Listed, UL916, UL864, C-UL and UL Accepted for use in Plenum, NEMA 1.

D. Power input: 120 Vac, 50-60 Hz or 208-277 Vac, 50-60 Hz as applicable.

E. Control Input: 5-25 Vac/dc, 50-60 Hz.

F. Relay status: LED on = activated.

2.05 VARIABLE FREQUENCY DRIVES

A. Rated input voltage: See schedules.

B. Variable torque horsepower: See schedules.

C. Enclosure: Power electronics and control electronics housed in NEMA 1 enclosure.

D. Electro-mechanical construction:
   1. Input voltage +/- 10 percent.
   2. Output current overload rating of 125 percent of motor FLA for 1 minute.
   3. Voltage source design using PWM inverter technology.
   4. Microprocessor based control circuit generating sine coded PWM output current waveform.

E. Non-volatile memory (NV RAM); all programming is maintained when disconnected from power.

F. Corrects displacement power factor to 98 percent throughout the motor speed range and eliminates power line notching, through the use of diode bridge input section or power factor correction capacitors and isolation tranformer.

G. Input phase insensitive, sequencing of the 3 phase input lines is not required.

H. Fused DC bus with capacitive filtering.

I. Insulated Gate Bipolar Transistors (IGBT) output, allowing motor noise, at 60 HZ, less that 2 dB (@ 1 meter) above that resulting from across the line operation.

J. Three current transformers detect the output current to provide: Electronic thermal overload protection, Three phase current limit, Ground fault protection, Short circuit protection and Speed search capability.

K. Digital operator keypad and display.

L. Power electronics provides efficiency of 97 percent (minimum).

M. Materials of construction UL 94-VO rated.

N. Non-Fused disconnect provided for motor service.

2.06 REFRIGERANT DETECTION SYSTEM

A. Manufacturers.
   1. MSA.
   2. Critical Environment Technologies.
   3. Intec.
   4. Brash Manufacturing Company, Inc.

B. System shall monitor machine room in areas as shown on the Drawings.

C. General: Detector shall contain a semiconductor and temperature compensated sensor capable of sensing R134a refrigerant. The detector shall be ETL listed containing a sensor and output board conforming to the UL 3111-1 standard. Enclosure shall be a NEMA 1 enclosure constructed of heavy gauge bonderized steel with baked on polyester finish and consist of cover and chassis. The detector shall have LED display to indicate status of sytem.

D. The detector shall provide a 4-20 ma DC, 0-1 VDC, 0-5 VDC or 0-10 VDC signal in direct relationship to the refrigerant gas concentration. The signal type can be selected or changed in the field and shall be compatible with building automation system.

E. An external switch in the bottom of the enclosure shall be provided to silence the internal alarm. The alarm circuit will automatically become inactive once the dector is no longer in alarm.

F. Output relays providing a normally closed set of contacts for low alert and the alarm shall be provided. These relays shall provide a fail-safe situation and will automatically operate ventilation equipment on power loss to the sensor. Relays shall be suitable for the connection of 24 VAC, 24 VA inductive circuits.

G. Switches shall provide field adjustment of the alert detection level and the on/off time delay for alert. The detection level selectable range shall be 50 to 800 PPM. The time delay selectable range shall be 0 to 7 minutes in increments of 1 minute.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Use copper tubing in mechanical rooms, where subject to damage or temperatures in excess of 200 degrees F, where adjacent to heating pipes passing through common sleeve, and where not readily accessible. In mechanical rooms bundled plastic tubing with suitable junction boxes or single plastic tubing with tray or raceway may be used.

C. Solder copper tubing except at instruments or equipment where compression fittings may be used.

D. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.

E. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.

F. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.
   1. Provide conduit and back boxes for products specified in this Section in accordance with the requirements of Sections 26 05 35.
   2. Provide electrical wiring and final connections to products specified in this Section in accordance with the requirements of Section 26 06 20.26.
   3. Provide conduit for all control wiring exposed to view. This includes but is not limited to all storage rooms, mechanical rooms, and similar spaces.
   4. Provide conduit for all control wiring concealed in inaccessible spaces. This includes but is not limited to wiring above/behind drywall and plaster ("hard") ceilings or soffits, and wiring within vertical chase spaces, regardless of whether access doors are provided or not.

END OF SECTION

SECTION 23 09 23
DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. System Description

B. Operator Interface

C. Controllers

D. Power Supplies and Line Filtering

E. System Software

F. Controller Software

G. HVAC Control Programs

H. Rough-in, wiring to, and final connections to products specified in this Section.

1.02 RELATED REQUIREMENTS

A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

B. Section 26 06 20.26 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Expand building control system to interface with new equipment and perform the sequence of operation specified. Modify automation system graphics to delete removed equipment and add new equipment.

B. Provide a color graphical representation of all systems. The graphical display shall include all points indicated in the pints list and any others required to achieve the sequences of operation. The graphical user interface shall consist of the following as a minimum;
   1. Menu bar navigation via windows-like bars.
   2. Navigation will also be available via an image of the building profile from which the user clicks on floors to bring up individual floor plans.
   3. Each major piece of mechanical equipment (terminal unit, AHU, boiler, chillers, cooling towers, etc.) shall have a pictorial dynamic color graphic. The central plant equipment may be combined as appropriate on one or more graphic page.
   4. Clicking on a unit on any summary screen shall bring up the complete graphic for that unit.
   5. Outside air temperature shall be displayed on each graphic screen.

1.05 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES

A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate both the ANSI/ASHRAE Standard 135-1995 BACnet and LonWorks technology communication protocols in one open, interoperble system.

B. The supplied computer software shall emply object-oriented technology (OOT) for representation of all data and control devices within the system. In addition, adherence to industry standards including ANSI/ASHRAE Standard 135-1995, BACnet and LonMark to assure interoperability between all system components is required. For each LonWorks device that does not have LonMark certification, the device supplier must provide a XIF file for the device. For each BACnet device, the device supplier must provide a PICS document showing the installed device = s-compliance level. Minimum compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet.

C. All components and controllers supplied under this contract shall be true Apeer-to-peer@ communicating devices. Components or controllers requiring Apolling@ by a host to pass data shall not be acceptable.

D. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on a supplier-installed server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable.

E. The installed system shall provide secure password access to all features, functions and data contained in the overall Building Management Control System (BMCS). Secrure Socket Layer (SSL) encryption shall be an available option for remote access.

F. The installed system must be totally scalable to allow for future expansion with the addition of controllers and/or input/output devices. It shall not be necessary to remove equipment supplied under this contract to expand the system.

G. The failure of any single component or network shall not interrupt the control functions of non-affected devices. A single network failure shall only affect shared communications or shared data; individual application controllers and network controllers shall continue normal operation minus only the data from a remote device from the affected network. Automatic default values for all network transported data shall be provide to allow continued operation until the network is restored.

H. The BMCS shall provide support for ODBC or SQL. An embedded database must be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write dated stored within it. A minimum offering would be the documentation of database schemes to allow users to read/write data into other applications using appropriate ODBS syntax.

I. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data.

1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for each system component and software module.

C. Shop Drawings:
1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
4. Indicate description and sequence of operation of operating, user, and application software.

D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
1. Revise shop drawings to reflect actual installation and operating sequences.

E. Operation and Maintenance Data:
1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Precision Control Systems of Chicago, Inc., Larry Bolek; 847-344-2215..

2.02 SYSTEM DESCRIPTION

A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units with communications to existing Building Management System.

B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.

C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.

D. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.03 OPERATOR INTERFACE

A. Existing to remain.

2.04 CONTROLLERS

A. CUSTOM APPLICATION CONTROLLERS
   1. General:
      a. Provide sufficient memory to support controller's operating system, database, and programming requirements.
      b. Share data between networked, microprocessor based controllers.
      c. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
      d. Utilize real-time clock for scheduling.
      e. Continuously check processor status and memory circuits for abnormal operation.
      f. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
      g. Communication with other network devices to be based on assigned protocol.
   2. Communication:
      a. Controller to reside on a LonWorks network using ANSI/CEA 709.1 (LonTalk) protocol.
      b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
   3. Anticipated Environmental Ambient Conditions:
      a. Outdoors and/or in Wet Ambient Conditions:
         1) Mount within waterproof enclosures.
         2) Rated for operation at 40 to 150 degrees F.
      b. Conditioned Space:
         1) Mount within dustproof enclosures.
         2) Rated for operation at 32 to 120 degrees F.
   4. Provisions for Serviceability:
      a. Diagnostic LEDs for power, communication, and processor.
      b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
   5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
   6. Power and Noise Immunity:
      a. Maintain operation at 90 to 110 percent of nominal voltage rating.
      b. Perform orderly shutdown below 80 percent of nominal voltage.
      c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.

B. APPLICATION SPECIFIC CONTROLLERS
1. General:
   a. Not fully user programmable, microprocessor based controllers dedicated to control specific equipment.
   b. Customized for operation within the confines of equipment served.
   c. Communication with other network devices to be based on assigned protocol.
2. Communication:
   a. Controller to reside on a BACnet network using MS/TP Data Link/Physical layer protocol.
   b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
3. Anticipated Environmental Ambient Conditions:
   a. Outdoors and/or in Wet Ambient Conditions:
      1) Mount within waterproof enclosures.
      2) Rated for operation at 40 to 150 degrees F.
   b. Conditioned Space:
      1) Mount within dustproof enclosures.
      2) Rated for operation at 32 to 120 degrees F.
4. Provisions for Serviceability:
   a. Diagnostic LEDs for power, communication, and processor.
   b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
6. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.

C. INPUT/OUTPUT INTERFACE
1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
2. All Input/Output Points:
   a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
   b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
3. Binary Inputs:
   a. Allow monitoring of On/Off signals from remote devices.
   b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
   c. Sense dry contact closure with power provided only by the controller.
4. Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.
5. Analog Inputs:

a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
b. Compatible with and field configurable to commonly available sensing devices.

6. Binary Outputs:
   a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
   b. Outputs provided with three position (On/Off/Auto) override switches.
   c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
7. Analog Outputs:
   a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
   b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
   c. Drift to not exceed 0.4 percent of range per year.
8. Tri State Outputs:
   a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
   b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
   c. Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
9. System Object Capacity:
   a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.
   b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

2.05 POWER SUPPLIES AND LINE FILTERING

A. Power Supplies:
   1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
   2. Limit connected loads to 80 percent of rated capacity.
   3. Match DC power supply to current output and voltage requirements.
   4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
   5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
   6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
   7. Operational Ambient Conditions: 32 to 120 degrees F.
   8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.
   9. Line voltage units UL recognized and CSA approved.

B. Power Line Filtering:

1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
2. Minimum surge protection attributes:
   a. Dielectric strength of 1000 volts minimum.
   b. Response time of 10 nanoseconds or less.
   c. Transverse mode noise attenuation of 65 dB or greater.
   d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

2.06 LOCAL AREA NETWORK (LAN)

A. Provide communication between control units over local area network (LAN).

B. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.

C. LAN Data Speed: Minimum 19.2 Kb.

D. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.

E. Transmission Median: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.

F. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.07 SYSTEM SOFTWARE

A. Operating System:
   1. Concurrent, multi-tasking capability.
      a. Common Software Applications Supported: Microsoft Excel.
   2. System Graphics:
      a. Animation displayed by shifting image files based on object status.
      b. Provide method for operator with password to perform the following:
         1) Move between, change size, and change location of graphic displays.
         2) Modify on-line.
         3) Add, delete, or change dynamic objects consisting of:
            (a) Analog and binary values.
            (b) Dynamic text.
            (c) Static text.
            (d) Animation files.
   3. Custom Graphics Generation Package:
      a. Create, modify, and save graphic files and visio format graphics in PCX formats.
      b. HTML graphics to support web browser compatible formats.
      c. Capture or convert graphics from AutoCAD.
   4. Standard HVAC Graphics Library:
      a. HVAC Equipment:
         1) Chillers.
         2) Boilers.
         3) Cooling Tower.

b. Ancillary Equipment:
    1) Fans.
    2) Pumps.
    3) Piping.

2.08 CONTROLLER SOFTWARE

A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.

B. System Security:
    1. User access secured via user passwords and user names.
    2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
    3. User Log On/Log Off attempts are recorded.
    4. Automatic Log Off occurs following the last keystroke after a user defined delay time.

C. Object or Object Group Scheduling:
    1. Weekly Schedules Based on Separate, Daily Schedules:
        a. Include start, stop, optimal stop, and night economizer.
        b. 10 events maximum per schedule.
        c. Start/stop times adjustable for each group object.

D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.

E. Alarms:
    1. Binary object is set to alarm based on the operator specified state.
    2. Analog object to have high/low alarm limits.
    3. All alarming is capable of being automatically and manually disabled.
    4. Alarm Reporting:
        a. Operator determines action to be taken for alarm event.
        b. Alarms to be routed to appropriate workstation.
        c. Reporting Options:

F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.

G. PID Control Characteristics:
    1. Direct or reverse action.
    2. Anti-windup.
    3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
    4. User selectable controlled variable, set-point, and PED gains.

H. Staggered Start Application:
    1. Prevents all controlled equipment from simultaneously restarting after power outage.
    2. Order of equipment startup is user selectable.

I. Anti-Short Cycling:
    1. All binary output objects protected from short-cycling.

2. Allows minimum on-time and off-time to be selected.

J. On-Off Control with Differential:
   1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
   2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.

K. Run-Time Totalization:
   1. Totalize run-times for all binary input objects.
   2. Provides operator with capability to assign high run-time alarm.

2.09 HVAC CONTROL PROGRAMS

A. General:
   1. Support Inch-pounds and SI (metric) units of measurement.
   2. Identify each HVAC Control system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.02 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.

C. Provide conduit and electrical wiring in accordance with Section 26 06 20.26. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.
   1. Provide conduit for all control wiring exposed to view. This includes but is not limited to all storage rooms, mechanical rooms, and similar spaces.
   2. Provide conduit for all control wiring concealed in inaccessible spaces. This includes but is not limited to wiring above/behind drywall and plaster ("hard") ceilings or soffits, and wiring within vertical chase spaces, regardless of whether access doors are provided or not.
   3. Control wiring that is concealed above readily accesible ceilings such as acoustical lay-in ceilings, need not be run in conduit.

3.03 MANUFACTURER'S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

B. Provide service engineer to instruct Owner's representative in operation of systems plant and equipment for 1 day period.

C. Provide basic operator training for 3 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 16 hours dedicated instructor time. Provide training on site.

3.04 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate complete and operating system to Owner.

END OF SECTION

SECTION 23 21 13
HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hydronic system requirements.

B. Heating water piping, above grade.

C. Chilled water piping, above grade.

D. Condenser water piping, above grade.

E. Pipe hangers and supports.

F. Unions, flanges, mechanical couplings, and dielectric connections.

G. Valves:
   1. Ball valves.
   2. Butterfly valves.
   3. Check valves.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 21 14 - Hydronic Specialties.

D. Section 23 25 00 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

A. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers; 2013.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; 2013.

E. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2013.

F. ASME B31.9 - Building Services Piping; 2011 (ANSI/ASME B31.9).

G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2013.

I. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2009).

J. ASTM B32 - Standard Specification for Solder Metal; 2008.

K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2009.

L. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.

M. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2013).

N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010.

O. AWWA C606 - Grooved and Shouldered Joints; 2011 (ANSI/AWWA C606).

P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

C. Project Record Documents: Record actual locations of valves.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum three years of experience.

B. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.

C. Welder Qualifications: Certify in accordance with ASME (BPV IX).
   1. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   3. Grooved mechanical joints may be used in accessible locations only.
      a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Owner.
      b. Use rigid joints unless otherwise indicated.
   4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated:
   1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
   2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
   3. In heating water, chilled water, or condenser water systems, butterfly valves may be used interchangeably with gate and globe valves.
   4. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

2.02 HEATING WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
   1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

2.03 CHILLED WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black; using one of the following joint types:
   1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

2.04 CONDENSER WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black.
   1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings with finish matching piping; AWS D1.1 welded.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

2.05 EQUIPMENT DRAINS AND OVERFLOWS

A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:
   1. Threaded Joints: Galvanized cast iron, or ASME B16.3 malleable iron fittings.

2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn; using one of the following joint types:
   1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

2.06 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

E. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.

F. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

G. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.

H. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

I. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.

J. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.

K. Vertical Support: Steel riser clamp.

L. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

M. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

N. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

O. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

2.07 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe 2 Inches and Under:
   1. Ferrous Piping: 150 psig malleable iron, threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe Over 2 Inches:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Copper Piping: Bronze.
   3. Gaskets: 1/16 inch thick preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWA C606.
   2. Mechanical Couplings: Comply with ASTM F1476.
   3. Housing Material: Ductile iron complying with ASTM A536.
   4. Gasket Material: EPDM suitable for operating temperature range from -30 degrees F to 230 degrees F.
   5. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
   6. When pipe is field grooved, provide coupling manufacturer's grooving tools.

2.08 BALL VALVES

A. Manufacturers:
   1. Nibco, Inc; Model S-585-70-66.
   2. Watts.
   3. Apollo.

B. Up To and Including 2 Inches:
   1. Bronze two piece body, stainless steel ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

2.09 BUTTERFLY VALVES

A. Manufacturers:
   1. Nibco; Model LD 2000.
   2. Crane Valve.
   3. Milwaukee Valve Company.

B. Body: Ductile iron with resilient molded-in EPDM seat, lug ends, extended neck.

C. Disc: Construct of aluminum bronze, geometric drive (one piece stem, no pin through disc).

D. Stem: Stainless steel with stem offset from the centerline to provide full 360 degree circumferential setting.

E. Operator: 10 position lever handle.

2.10 SWING CHECK VALVES

A. Manufacturers:
   1. Nibco, Inc.
   2. Stockham.
   3. Grinnell.

B. Up To and Including 2 Inches:

1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder ends.
2. Nibco Model S-433-Y.

C. Over 2 Inches:
1. Iron body, bronze trim, bronze faced rotating swing disc, renewable disc and seat, flanged ends.
2. Nibco Model F-918-B.

2.11 SPRING LOADED CHECK VALVES

A. Manufacturers:
1. Nibco, Inc.
2. Hammond Valve.
3. Milwaukee Valve Company.

B. Iron body, bronze trim, split plate, hinged with stainless steel spring, resilient seal bonded to body, wafer or threaded lug ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. Refer to Section 23 25 00 for additional requirements.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install heating water, chilled water, and condenser water piping to ASME B31.9 requirements. Install chilled water piping to ASME B31.5 requirements.

C. Route piping in orderly manner, parallel to building structure, and maintain gradient.

D. Install piping to conserve building space and to avoid interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls and floors.

G. Provide sleeve and watertight mechanical seal on all underground floor and wall penetrations.

H. Slope piping and arrange to drain at low points.

I. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.

J. Grooved Joints:
   1. Install in accordance with the manufacturer's latest published installation instructions.
   2. Gaskets to be suitable for the intended service, molded, and produced by the coupling manufacturer.

K. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

L. Use eccentric reducers to maintain top of pipe level.

M. Install valves with stems upright or horizontal, not inverted.

3.03 SCHEDULES

A. Hanger Spacing for Steel Piping.
   1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
   2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
   4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
   5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
   6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
   7. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
   8. 6 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.

END OF SECTION

SECTION 23 21 14
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air vents.

B. Strainers.

C. Combination pump discharge valves.

D. Combination flow controls.

E. Relief valves.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.

C. Project Record Documents: Record actual locations of flow controls.

D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 AIR VENTS

A. Manufacturers:
   1. Armstrong International, Inc.
   2. ITT Bell & Gossett.
   3. Taco, Inc.

B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

C. Float Type:
   1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
   2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

2.02 STRAINERS

A. Manufacturers:
   1. Armstrong International, Inc.
   2. Wilkins.
   3. Watts Regulator.

B. Size 2 inch and Under:
   1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

C. Size 2-1/2 inch to 4 inch:
   1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

2.03 COMBINATION PUMP DISCHARGE VALVES

A. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.04 COMBINATION FLOW CONTROLS

A. Manufacturers:
   1. ITT Bell & Gossett.
   2. Armstrong Industries.
   3. Tour & Anderson Hydonics.
   4. Taco, Inc.

B. Construction:
   1. Up to 2 inches; Bronze body, bronze trim.
   2. Over 2 inches; Ductile iron body, bronze trim.

C. Control Mechanism: Y-pattern globe valve and digital handwheel with memory stop, inside screw, rubber O-ring disc, solder or screwed ends. Valve shall provide precise flow measurement, precision flow balancing, positive shut-off with no drip seat and drain port for hose bib fitting.

2.05 RELIEF VALVES

A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

2.06 MULTI-PORT PRESSURE MANIFOLD

A. Manufacturers:
   1. Flow Conditioning Corp: Trumpet Valve.
   2. Hydronic Monitor Co., Inc.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. One piece manifold of brass construction with ports for connection to hydronic system. Spring return pushbuttons, gauge connection port and test port connection for gauge calibration.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Provide manual air vents at system high points and as indicated.

C. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

D. Provide valved drain and hose connection on strainer blow down connection.

E. Provide combination pump discharge valve on discharge side of centrifugal pumps .

F. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.

G. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

H. Pipe relief valve outlet to nearest floor drain.

I. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

J. Multi-port pressure manifold shall be attached to system piping with heavy bracket at height to permit easy pushbutton operation and gauge observation.

END OF SECTION

SECTION 23 21 23
HYDRONIC PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vertical in-line pumps.

1.02 RELATED REQUIREMENTS

A. Section 26 06 20.26 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.

B. UL 778 - Standard for Motor-Operated Water Pumps; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

C. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Pump Seals: One set for each type and size of pump.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Armstrong Pumps Inc.

B. ITT Bell & Gossett.

C. Taco, Inc..

2.02 HVAC PUMPS - GENERAL

A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

B. Products Requiring Electrical Connection: Listed and classified by UL or testing agency acceptable to authority having jurisdiction as suitable for the purpose specified and indicated.

2.03 VERTICAL IN-LINE PUMPS

A. Type: Vertical, single stage, close coupled, radially split casing, for in-line mounting, for 175 psi working pressure.

B. Casing: Cast iron, with suction and discharge gage port, casing wear ring, seal flush connection, drain plug, flanged suction and discharge.

C. Impeller: Bronze, fully enclosed, keyed directly to motor shaft or extension.

D. Shaft: Stainless steel with stainless steel impeller cap screw or nut and bronze sleeve.

E. Seal: Mechanical seal, 225 degrees F maximum continuous operating temperature.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.

C. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For close coupled or base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.

D. Provide line sized shut-off valve and strainer on pump suction, and line sized combination pump discharge valve on pump discharge.

E. Lubricate pumps before start-up.

END OF SECTION

SECTION 23 25 00
HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cleaning of piping systems.

B. Chemical feeder equipment.

C. Chemical treatment.

1.02 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Earthwise Environmental Inc.; Chris Koepke - 630-774-0419.. OCUSD 308 has a service contract with Earthwise Environmental. Earthwise shall be contracted by installing contractor to provide cleaning and water treatment chemicals.

2.02 MATERIALS

A. System Cleaner:
   1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodium tripoly phosphate and sodium molybdate.

B. Closed System Treatment (Water):
   1. Sequestering agent to reduce deposits and adjust pH; polyphosphate.
   2. Corrosion inhibitors; boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.
   3. Conductivity enhancers; phosphates or phosphonates.

C. Condenser Water System Treatment (Cooling Towers):
   1. Sequestering agent to inhibit scaling; phosphonates, sodium polyphosphates, lignin derivatives, synthetic polymer polyelectrolytes, or organic phosphates.
   2. Acid to reduce alkalinity and pH; sulphuric acid.
   3. Corrosion inhibitor; zinc-phosphate, phosphonate-phosphate, phosphonate-molybdate and phosphonate-silicate, sodium tolyltriazole, or low molecular weight polymers.

PART 3 EXECUTION

3.01 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.02 CLEANING SEQUENCE

A. Concentration:
   1. As recommended by manufacturer.

B. Hot Water Heating Systems:
   1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
   2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
   3. Circulate for 6 hours at design temperatures, then drain.
   4. Refill with clean water and repeat until system cleaner is removed.

C. Chilled Water Systems:
   1. Circulate for 48 hours, then drain systems as quickly as possible.
   2. Refill with clean water, circulate for 24 hours, then drain.
   3. Refill with clean water and repeat until system cleaner is removed.

D. Use neutralizer agents on recommendation of system cleaner supplier and approval of Owner.

E. Flush open systems with clean water for one hour minimum. Drain completely and refill.

F. Remove, clean, and replace strainer screens.

G. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.

1.02 RELATED REQUIREMENTS

A. Section 23 07 13 - Duct Insulation: External insulation and duct liner.

B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

1.03 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2012.

E. SMACNA (DCS) - HVAC Duct Construction Standards; 2005.

1.04 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A standards.

1.05 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.

B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   2. VOC Content: Not more than 250 g/L, excluding water.
   3. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.

C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

D. All Ducts: Galvanized steel, unless otherwise indicated.

E. General Exhaust: 1 inch w.g. pressure class, galvanized steel.

F. Combustion Air: 1 inch w.g. pressure class, galvanized steel.

2.02 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and as indicated.

B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE Handbook - Fundamentals.

C. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

D. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

F. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA HVAC Duct Construction Standards.

G. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards.

B. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. Duct sizes indicated shall be of sizes indicated. However, necessary changes in shape offsets or crossovers to clear piping, lighting, building construction obstructions, etc. shall be made without additional cost.

E. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

G. Use double nuts and lock washers on threaded rod supports.

H. At exterior wall louvers, seal duct to louver frame and install blank-out panels.

END OF SECTION

SECTION 23 34 23
HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof exhausters.

1.02 RELATED REQUIREMENTS

A. Section 26 06 20.26 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.; 2010.

B. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005.

C. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; 2007 (ANSI/AMCA 210, same as ANSI/ASHRAE 51).

D. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc.; http://www.amca.org/certified/search/company.aspx.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Greenheck.

B. Loren Cook Company; Model ACE-B.

C. Twin City.

2.02 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.

B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

C. Sound Ratings: AMCA 301, tested to AMCA 300, and bearing AMCA Certified Sound Rating Seal.

D. Fabrication: Conform to AMCA 99.

E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 ROOF EXHAUSTERS

A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.

B. Upblast or downblast as scheduled.

C. Finish: Factory applied baked enamel/polyester of color as selected.

D. Roof Curb: 16 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.

E. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor .

F. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

G. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.

C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

D. Provide sheaves required for final air balance.

E. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 23 52 39.13
FIRE-TUBE BOILERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Boilers.

B. Controls and boiler trim.

C. Hot water connections.

D. Fuel burning system and connection.

E. Chimney connection.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 23 21 14 - Hydronic Specialties.

C. Section 26 06 20.26 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers; 2012.

B. ASME BPVC-I - Boiler and Pressure Vessel Code, Section I - Rules for Construction of Power Boilers; The American Society of Mechanical Engineers; 2013.

C. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; The American Society of Mechanical Engineers; 2013.

D. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2012.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements, and service connections.

C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 REGULATORY REQUIREMENTS

A. Conform to ASME BPVC-I for construction of boilers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect boilers from damage by leaving factory inspection openings and shipping packaging in place until final installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. The complete heat exchanger assembly shall carry a ten (10) year limited warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aerco International, Inc.; Model BMK1500.

B. Lochinvar; Model Crest.

C. Fulton; Model Endura.

2.02 DESCRIPTION

A. Boiler modules shall be natural gas fired, condensing fire tube design with a modulating forced draft power burner and positive pressure vent discharge. Each boiler shall be UL listed, CSD-1 approved, ASME coded and stamped and incorporate a gas train designed in accordance with FM. The boiler manufacturer must publish known part load value efficiencies; the thermal efficiency must increase as the firing rate decreases. The boiler panel shall be proprietary in design and incorporate the functions of temperature control, combustion safegaurd control, message annunciation, and fault diagnostic display, on individual filed replaceable circuit boards mounted within a single housing. Each boiler shall have a footprint of no more than 28 inches wide with a UL Listing for zero side wall clearance.

B. Electrical service to each boiler shall be 120V/1/60HZ 20 amp service.

C. Each boiler shall have an ASME approved relief valve setting of 30 psig.

2.03 MODULATING AIR/FUEL VALVE AND BURNER

A. The boiler burner shall be capable of a 20 to 1 turndown ratio of the firing rate without loss of combustion efficiency or staging of gas valves. The burner shall be metal-fiber mesh covering a stainless steel body with spark ignition and flame rectification. All burner material exposed to the combustion zone shall be of stainless steel construction. There shall be no moving parts within the burner itself. A modulating air/fuel valve shall meter the air and natural gas input. The modulating motor must be linked to both the gas valve body and air valve body with a single linkage. The linkage shall not require any field adjustment. A variable frequency drive, controlled cast aluminum pre-mix blower shall be used to ensure the optimum mixing of air and fuel between th air/fuel valve and the burner.

2.04 PRESSURE VESSEL/HEAT EXCHANGER

A. The boiler shall be capable of handling return water temperatures down to 40 degrees F without any failure due to thermal shock or fireside condensation. The boiler water connections shall be 3-inch flanged 150 lb. ANSI rated. The pressure vessel is constructed of SA53 carbon steel, with a 0.25 in. thick wall and 0.50 in. thick upper head. Inspection openings in the pressure vessel shall be in accordance with ASME Section IV pressure vessel code.

B. The boiler shall be designed so that the thermal efficiency increases as the boiler firing rate decreases. The heat exchanger shall be constructed of 439 stainless steel fire tubes and tube sheets with a one-pass combustion gas flow design. The fire tubes shall be 1/2 in. OD with no less than 0.035 in. wall thickness. The upper and lower stainless steel tubesheet shall be no less than 0.25 in. thick. The pressure vessel/heat exchanger shall be welded construction. The heat exchanger shall be ASME stamped for a working pressure not less than 160 psig. Access to the tubesheets and heat exchanger is available by burner and exhaust manifold removal. Minimum access opening shall be no less than 6 in. diameter.

2.05 EXHAUST MANIFOLD

A. The exhaust manifold shall be of corrosion resistant porcelainized cast iron with an 6-inch diameter flue connection. The exhaust manifold shall have a gravity drain for the elimination of the condensation with collecting reservoir.

2.06 BLOWER

A. The blower shall include a variable-speed, DC centrifugal fan to operate during the burner firing sequence and pre-purge the combustion chamber.

2.07 BOILER CONTROLS

A. The boiler control system shall be segregated into three components: Control Panel, Power Box, and Input/Output Connection Box. The entire system shall be Underwriters Laboratories Recognized.

B. The control panel shall consist of 6 individual circuit boards utilizing state-of-the-art surface-mount technology, in a single enclosure. These circuit boards shall be defined as follows: display board incorporating LED display to read temperature, and a VFD display module for all message annunciation; CPU board which houses all control functions; electric low water cutoff board with test and manual reset functions; power supply board; ignition/stepper board incorporating flame safeguard control; and connector board. Each board shall be individually field replaceable. The combustion safeguard/flame monitoring system shall utilize spark ignition and a rectification type flame sensor. The control panel hardware shall support both RS-232 and RS-485 remote communications. The controls shall annunciate boiler & sensor status and include extensive self-diagnostic capabilities that incorporates a minimum of 8 separate status messages and 34 separate fault messages.

C. The control panel shall incorporate three self-governing features designed to enhance operation in modes where it receives an external control signal by eliminating nuisance faults due to over-temperature, improper external signal or loss of external signal. These features are called:

1. Setpoint High Limit; allows for a selectable maximum boiler outlet temperature and acts as temperature limiting governor. It is a PID function that automatically limits firing rate to maintain outlet temperature within a 0 to 10 degree selectable band from the desired maximum boiler outlet temperature.
2. Setpoint Low Limit; allows for a selectable minimum operating temperature.
3. Failsafe Mode; allows the boiler to switch its mode to operate from an internal setpoint if its external control signal is lost, rather than shut off. This is a selectable mode; hence the control can be set to shut off the unit upon loss of external signal if so desired.

D. The boiler control system shall incorporate the following additional features for enhanced external system interface; system start temperature feature; pump delay timer; auxiliary start delay timer; auxiliary temperature sensor; mA output feature which allows for simple monitoring of either temperature setpoint, outlet temperature, or fire rate; remote interlock circuit; delayed interlock circuit; and fault relay for simple remote fault alarm.

E. Each boiler shall utilize an electric single seated safety shutoff valve with proof of closure switch in its gas train and incorporate dual over-temperature protection with manual reset in accordance with ASME Section IV and CSD-1.

2.08 TEMPERATURE CONTROL MODES

A. Internal Setpoint:
1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler. Control of discharge water temperature shall be set through an internal setpoint with an adjustment of 50 degrees F to 190 degrees F. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler and without header temperature swings.
2. The boiler will operate to maintain a constant header temperature outlet to + or - 2 degrees F. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. Controls shall be fully field adjustable from 50 degrees F to 190 degrees F in operation. Main header outlet temperature shall not be more than + or - 2 degrees F from setpoint at any point of operation. The boiler shall have LCD display for monitoring of all sensors and interlocks.

B. Indoor/Outdoor Reset:
1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler plant. The system shall be comprised of a microprocessor-based control utilizing pulse width modulation for bumpless transfer of header temperature. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler and without header temperature swings.
2. The boiler will operate to vary header temperature setpoint on an inverse ratio in response to outdoor temperature to control discharge temperature + or - 2 degrees F. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. Reset ratio shall be fully field adjustable from 0.3 to 3.0 in operation. The boiler shall have LCD display for monitoring of all sensors and interlocks.

C. 4mA to 20mA Temperature Setpoint:

1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler without header temperature swings.
2. The boiler will operate to vary header temperature setpoint linearly as an externally applied 4mA to 20 mA signal is supplied. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. Main Header outlet temperature shall not be more than + or - 2 degrees F from setpoint at any point of operation. The boiler shall have LCD display for monitoring of all sensors and interlocks.

D. Network Temperature Setpoint:
1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler without header temperature swings.
2. The boiler will operate to vary header temperature setpoint as an external communication utilizing the MODBUS protocol is supplied via the RS-485 port. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. Main Header outlet temperature shall not be more than + or - 2 degrees F from setpoint at any point of operation. The boiler shall have LCD display for monitoring of all sensors and interlocks.

E. 4mA to 20mA Direct Drive:
1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler without header temperature swings.
2. The boiler will operate to vary the boiler firing rate linearly as an externally applied 4mA to 20mA signal is supplied. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. The boiler shall have LCD display for monitoring of all sensors and interlocks.

F. Network Direct Drive:
1. Boiler shall include integral factory wired operating controls to control all operation and energy input of the boiler. The controller shall have the ability to vary boiler input throughout its full range to maximize the condensing capability of the boiler without header temperature swings.
2. The boiler will operate to vary the boiler firing rate as an external communication utilizing the MODBUS protocol is supplied via the RS-485 port. Unit shall operate with an Inverse Efficiency Curve, with known Part Load Value Efficiencies. Maximum efficiency shall be achieved at minimum firing input. The boiler shall have LCD display for monitoring of all sensors and interlocks.

G. Boiler Management System (BMS):
1. The boiler Manufacturer shall supply as part of the boiler package a completely integrated Boiler Management System to control all operation and energy input of the multiple boiler heating plant. The Boiler Management System shall be comprised of a microprocessor based control utilizing the MODBUS protocol to communicate with the boilers via the RS-485 port. The BMS controller shall have the ability to operate up to 32 boilers per BMS panel. Aerco Model 168 programmer.

2. The controller shall have the ability to vary the firing rate and energy input of each individual boiler throughout its full modulating range to maximize the condensing capability and thermal efficiency output of the entire heating plant. The BMS shall control the boiler outlet header temperature within + or - 2 degrees F. The controller shall be a PID type controller for accurate temperature control with excellent variable load response. The BMS controller shall provide contact closure for auxiliary equipment such as system pumps and combustion air inlet dampers based upon outdoor air temperature.
3. When set on Internal Setpoint Mode, temperature control setpoint on the BMS shall be fully field adjustable from 50 degrees F to 190 degrees F in operation. When set on Indoor/Outdoor Reset Mode, the BMS will operate on an adjustable inverse ratio in response to outdoor temperature to control the main header temperature. Reset ratio shall be fully field adjustable from 0.3 to 3.0 in operation. When set on 4 mA to 20 mA Temperature Control Mode, the BMS will operate the plant to vary header temperature sepoint linearly as an externally applied 4-20 mA signal is supplied. When set on MODBUS Temperature Control Mode, the BMS will operate the plant to vary header temperature setpoint as an external communication utilizing the MODBUS protocol is supplied via the RS-232 port. The BMS controller shall have a LCD display for monitoring of all sensors and interlocks. Non-volatile memory backup of all control parameters shall be internally provided as standard. The controller will automatically balance the sequence of operating time on each module by a first-on first-off mode and provide for setback and remote alarm contacts. Connection between central BMS system and individual modules shall be twisted pair low voltage wiring, with the boilers 'daisy-chained' for ease of installation.

2.09 CONTROLS INTEROPERABILITY

A. The control panel and the BMS shall utilize the MODBUS open protocol to interface with third party building automation systems. When the Building Automation System (BAS) does not have MODBUS protocol capability, the installing contractor shall provide a MODBUS Gateway to act as interface/translator between the BAS via either the RS-485 port of the boiler control panel or the RS-232 port of the BMS.

B. Operating parameters interfaced and displayed on the BAS for each boiler shall include;
   1. Comm address.
   2. Unit status.
   3. Fault status.
   4. Outlet temperature.
   5. Ffwd temperature.
   6. Inlet temperature.
   7. Exhaust temperature.
   8. Air temperature.
   9. Flame Strength.
   10. Fire rate in.
   11. Fire rate out.
   12. Unit type.
   13. Unit size.
   14. Network remote setpoint.
   15. Run cycles.

16. Run hours.
17. O2 level.

2.10 VENTING

A. Vent system shall be an insulated positive stack pressure system and Category IV vent material in accordance to ANSI Standard (AGA) and CGA standards. Boiler venting shall be provided through stainless steel Grade AL 29-4C and shall be able to handle positive pressure and flue gas condensate.

B. Seams shall be plasma welded and joints shall overlap 3 inches with two ridges to prevent migration of condensation by capillary action to the outside. Complete joints with high temperature siliconed and locking band with ceramic fiber gasket.

C. Provide all necessary fittings, supports and termination cap. Include connector pieces and condensate drain connections.

D. System design and configuration must be approved by the boiler manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install boiler and provide connection of natural gas service in accordance with requirements of NFPA 54 and applicable codes.

C. Install boiler on concrete housekeeping base, sized minimum 4 inches larger than boiler base. Refer to Section 03 30 00.

D. Provide piping connections and accessories as indicated; refer to Section 23 21 14.

E. Pipe relief valves to nearest floor drain.

F. Install circulator on boiler.

G. Provide for connection to electrical service. Refer to Section 26 06 20.26.

3.02 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

3.03 CLOSEOUT ACTIVITIES

A. Train operating personnel in operation and maintenance of units.

B. Provide the services of manufacturer's field representative to conduct training.

END OF SECTION

SECTION 23 64 16
CENTRIFUGAL WATER CHILLERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chiller package.

B. Charge of refrigerant and oil.

C. Controls and control connections.

D. Chilled water connections.

E. Condenser water connections.

F. Starters.

G. Electrical power connections.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete housekeeping pads.

B. Section 23 05 53 - Identification for HVAC Piping and Equipment.

C. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

D. Section 23 21 13 - Hydronic Piping.

E. Section 23 21 14 - Hydronic Specialties.

F. Section 23 21 23 - Hydronic Pumps.

G. Section 26 06 20.26 - Wiring Connections.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

C. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Indicate equipment, piping and connections, valves, strainers, and thermostatic valves required for complete system.

D. Manufacturer's Certificate: Certify that components of package not furnished by manufacturer have been selected in accordance with manufacturer's requirements.

E. Operation and Maintenance Data: Include start-up instructions, maintenance data, parts lists, controls, and accessories. Include trouble- shooting guide.

F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide a five year warranty to include coverage for compressor and complete chiller package as manufactured and delivered to site including materials and labor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Smardt Chiller to be provided is identified in attached documents. Coordinate purchase and delivery with Bullock, Logan & Associates, Inc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide for connection to electrical service.

C. Align chiller on concrete foundations, sole plates, and sub-bases. Level, grout, and bolt in place.

D. Provide evaporator connections to chilled water piping.
   1. On inlet, provide:
      a. Thermometer well and thermometer.
      b. Strainer.
      c. Nipple and flow switch.
      d. Flexible pipe connector.
      e. Pressure gage.
      f. Shut-off valve.
   2. On outlet, provide:
      a. Thermometer well and thermometer.
      b. Flexible pipe connector.
      c. Pressure gage.
      d. Shut-off valve.

E. Provide condenser connection to condenser water piping.
   1. On inlet, provide:
      a. Thermometer well and thermometer.
      b. Strainer.
      c. Nipple and flow switch.
      d. Flexible pipe connector.
      e. Pressure gage.
      f. Shut-off valve.
   2. On outlet, provide:
      a. Thermometer well and thermometer.

b. Flexible pipe connector.
c. Pressure gage.
d. Shut-off valve.

F. Arrange piping for easy dismantling to permit tube cleaning.

G. Provide piping from chiller rupture disc to outdoors. Size as recommended by manufacturer.

H. Install per manufacturer's requirements, shop drawings, and Contract Documents.

I. Adjust chiller alignment on foundations, or subbases as called for on drawings.

J. Arrange piping to allow for dismantling to permit head removal and tube cleaning.

K. Coordinate electrical installation with electrical contractor.

L. Coordinate controls with control contractor.

M. Provide all material required for a fully operational and functional chiller.

3.02 CLOSEOUT ACTIVITIES

A. Train operating personnel in operation and maintenance of units.

B. Provide the services of the manufacturer's field representative to conduct training.

END OF SECTION

Bullock, Logan & Associates, Inc.

"The Heat Transfer Specialists"

May 6, 2014

Pat Dacy
Oswego School District 308

RE: SMARDT CHILLER / OSWEGO PRE PURCHASE – Wheatland School - 200 Ton Chiller

Dear Pat:

Thank you for thinking of Bullock, Logan & Associates for your cooling system needs. We are pleased offer a proposal on the following, High Efficiency, Smardt Chiller based the project plans and specifications.

200 TR CHILLER – Wheatland School

Qty(1) SMARDT, HIGH EFFICIENCY MAGNETIC BEARING, OIL FREE CHILLER Model WA080.2EXXX.FXAKJA.FXAMJA.NXX / 200 Ton Water Cooled Variable Speed Chiller

Included:

- Qty(2) Danfoss, TT300 Turbocor, oil-free, direct drive centrifugal compressor with VFD Control
- Step-less capacity control via inlet guide vanes & VSD for variable loads
- Operation on zero ODP HFC R134a refrigerant
- Compressor suction and discharge isolation valves
- Flooded, mechanically cleanable evaporator built AS1210/ASME standard
- Electronic expansion valves
- Electronic condenser refrigerant monitor
- Shell and Tube Evaporator and Condenser Bundles
- Evaporator and Condenser water boxes rated to 145 psig w/ grooved connections
- ¾" closed cell evaporator insulation
- 12 inch touch screen w/ Kiltech controller
- ModBus RTU interface to BMS
- Factory installed Chilled water and Condenser Water Dp flow sensors.
- Qty(1) Single point electrical connection.
- **5 Year Warranty including coverage for complete chiller package, materials, seals, capacitors, Compressors, and Labor.**
- Refrigerant Installed at the factory.
- Factory Authorized Startup
- Check Refrigerant Charge
- Instruct Owner
- Freight, FOB Factory to Oswego
- **Supervise Contractor if On-Site Assembly and Reassembly is Required**

169 Crossen Avenue
Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

Not Included:

- **Knocked Down Construction. Assembly and disassembly if required will have to be done by unsweating piping and disconnecting compressors, etc. at the job site with Supervision by Bullock, Logan & Associates at no additional cost (labor not included).**
- Refrigerant Monitor
- Wiring, Rigging, Installation, Vibration Isolators (not req'd), and Taxes.

Price: $114,957.00 This unit can be shipped 8 weeks from release for production.

Note: Chiller can still be taken apart without Knocked Down Construction Add, unsweating and resweating of piping would be required.

All Pricing Firm for Thirty (30) Days from date of proposal.

Units shipped F.O.B. Factory with freight allowed to the first destination.
Payment Terms Net Thirty (30) Days.

We trust this information meets with your approval. Thanks again for thinking of us on this project and please contact us at anytime if you have questions or if we may be of any further assistance.

Very truly yours,
BULLOCK, LOGAN & ASSOCIATES, INC.
Manufacturer's Representatives for Smardt Inc.

Curt J. Bullock Jr.

Curt J. Bullock Jr.

169 Crossen Avenue
Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

Bullock, Logan & Associates, Inc.

"The Heat Transfer Specialists"

May 6, 2014

Pat Dacy
Oswego School District 308

RE: SMARDT CHILLER / OSWEGO PRE PURCHASE – Wheatland School - 200 Ton Chiller

Dear Pat:

Thank you for thinking of Bullock, Logan & Associates for your cooling system needs. We are pleased offer a proposal on the following, High Efficiency, Smardt Chiller based the project plans and specifications.

200 TR CHILLER – Wheatland School

Qty(1) SMARDT, HIGH EFFICIENCY MAGNETIC BEARING, OIL FREE CHILLER Model WA080.2EXXX.FXAKJA.FXAMJA.NXX / 200 Ton Water Cooled Variable Speed Chiller

Included:

- Qty(2) Danfoss, TT300 Turbocor, oil-free, direct drive centrifugal compressor with VFD Control
- Step-less capacity control via inlet guide vanes & VSD for variable loads
- Operation on zero ODP HFC R134a refrigerant
- Compressor suction and discharge isolation valves
- Flooded, mechanically cleanable evaporator built AS1210/ASME standard
- Electronic expansion valves
- Electronic condenser refrigerant monitor
- Shell and Tube Evaporator and Condenser Bundles
- Evaporator and Condenser water boxes rated to 145 psig w/ grooved connections
- ¾" closed cell evaporator insulation
- 12 inch touch screen w/ Kiltech controller
- ModBus RTU interface to BMS
- Factory installed Chilled water and Condenser Water Dp flow sensors.
- Qty(1) Single point electrical connection.
- **5 Year Warranty including coverage for complete chiller package, materials, seals, capacitors, Compressors, and Labor.**
- Refrigerant Installed at the factory.
- Factory Authorized Startup
- Check Refrigerant Charge
- Instruct Owner
- Freight, FOB Factory to Oswego
- **Supervise Contractor if On-Site Assembly and Reassembly is Required**

169 Crossen Avenue
Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

Not Included:

- **Knocked Down Construction. Assembly and disassembly if required will have to be done by unsweating piping and disconnecting compressors, etc. at the job site with Supervision by Bullock, Logan & Associates at no additional cost (labor not included).**
- Refrigerant Monitor
- Wiring, Rigging, Installation, Vibration Isolators (not req'd), and Taxes.

Price: $114,957.00 This unit can be shipped 8 weeks from release for production.

Note: Chiller can still be taken apart without Knocked Down Construction Add, unsweating and resweating of piping would be required.

All Pricing Firm for Thirty (30) Days from date of proposal.

Units shipped F.O.B. Factory with freight allowed to the first destination.
Payment Terms Net Thirty (30) Days.

We trust this information meets with your approval. Thanks again for thinking of us on this project and please contact us at anytime if you have questions or if we may be of any further assistance.

Very truly yours,
BULLOCK, LOGAN & ASSOCIATES, INC.
Manufacturer's Representatives for Smardt Inc.

Curt J. Bullock Jr.

Curt J. Bullock Jr.

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Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

Bullock, Logan & Associates, Inc.

"The Heat Transfer Specialists"

May 6, 2014

Pat Dacy
Oswego School District 308

RE: SMARDT CHILLER / OSWEGO PRE PURCHASE - FOX CHASE & WHEATLANDS - 260 Ton & 200 Ton Chillers

Dear Pat:

Thank you for thinking of Bullock, Logan & Associates for your cooling system needs. We are pleased offer a proposal on the following, High Efficiency, Smardt Chiller based the project plans and specifications.

260 TR CHILLER – Fox Chase School

Qty(1) SMARDT, HIGH EFFICIENCY MAGNETIC BEARING, OIL FREE CHILLER Model WA095.2HXXX.FXAUHA.FXAVHA.NXX / 260 Ton Water Cooled Variable Speed Chiller

Included:

- Qty(2) Danfoss, TT400 Turbocor, oil-free, direct drive centrifugal compressor with VFD Control
- Step-less capacity control via inlet guide vanes & VSD for variable loads
- **REFRIGERANT ECONOMIZER FOR HEIGHER EFFICIENCY OPERATION**
- Operation on zero ODP HFC R134a refrigerant
- Compressor suction and discharge isolation valves
- Flooded, mechanically cleanable evaporator built AS1210/ASME standard
- Electronic expansion valves
- Electronic condenser refrigerant monitor
- Shell and Tube Evaporator and Condenser Bundles
- Evaporator and Condenser water boxes rated to 145 psig w/ grooved connections
- ¾" closed cell evaporator insulation
- 12 inch touch screen w/ Kiltech controller
- ModBus RTU interface to BMS to be determined.
- Factory installed Chilled water and Condenser Water Dp flow sensors.
- Qty(1) Single point electrical connection.
- **5 Year Warranty including coverage for complete chiller package, materials, seals, capacitors, Compressors, and Labor.**
- Refrigerant Installed at the factory.
- Factory Authorized Startup
- Check Refrigerant Charge
- Instruct Owner
- Freight, FOB Factory to Oswego
- **Does Not Include Knocked Down Construction with Economizer Option**
- **Supervise Contractor if On Site Assembly and Reassembly is Required.**

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Phone : 847-434-1200 Fax : 847-434-1195

Not Included:

- **Knocked Down Construction is not available with the economizer option. Assembly and disassembly if required will have to be done by unsweating piping and disconnecting compressors, etc. at the job site with Supervision by Bullock, Logan & Associates at no additional cost (labor not included).**
- Refrigerant Monitor
- Wiring, Rigging, Installation, Vibration Isolators (not req'd), and Taxes.

Price: $130,469.00 This Chiller is in Stock at this time and could ship in 2 Weeks from release for production.

The above Proposal for Fox Chase School has been accepted. We agree to the amount on the above listed quotation based upon approved submittals. The above chiller is a Stock Chiller and can only be changed by the water connection locations not affecting the chiller performance. With receipt of this signed proposal we will hold this stock chiller for Oswego School District and release drawings for approval. A purchase order made out to Bullock, Logan & Associates must follow shortly.

Accepted By: _____ Date: 5/08/14
Sign Name

Accepted By: _____ Title: _____
Print Name

200 TR CHILLER – Wheatlands School

Qty(1) SMARDT, HIGH EFFICIENCY MAGNETIC BEARING, OIL FREE CHILLER Model WA080.2EXXX.FXAKJA.FXAMJA.NXX / 200 Ton Water Cooled Variable Speed Chiller

Included:

- Qty(2) Danfoss, TT300 Turbocor, oil-free, direct drive centrifugal compressor with VFD Control
- Step-less capacity control via inlet guide vanes & VSD for variable loads
- Operation on zero ODP HFC R134a refrigerant

169 Crossen Avenue
Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

- Compressor suction and discharge isolation valves
- Flooded, mechanically cleanable evaporator built AS1210/ASME standard
- Electronic expansion valves
- Electronic condenser refrigerant monitor
- Shell and Tube Evaporator and Condenser Bundles
- Evaporator and Condenser water boxes rated to 145 psig w/ grooved connections
- ¾" closed cell evaporator insulation
- 12 inch touch screen w/ Kiltech controller
- ModBus RTU interface to BMS
- Factory installed Chilled water and Condenser Water Dp flow sensors.
- Qty(1) Single point electrical connection.
- **5 Year Warranty including coverage for complete chiller package, materials, seals, capacitors, Compressors, and Labor.**
- Refrigerant Installed at the factory.
- Factory Authorized Startup
- Check Refrigerant Charge
- Instruct Owner
- Freight, FOB Factory to Oswego
- **Supervise Contractor if On-Site Assembly and Reassembly is Required**

Not Included:

- **Knocked Down Construction. Assembly and disassembly if required will have to be done by unsweating piping and disconnecting compressors, etc. at the job site with Supervision by Bullock, Logan & Associates at no additional cost (labor not included).**
- Refrigerant Monitor
- Wiring, Rigging, Installation, Vibration Isolators (not req'd), and Taxes.

Price: $114,957.00 This unit can be shipped 8 weeks from release for production.

Note: Chiller can still be taken apart without Knocked Down Construction Add, unsweating and resweating of piping would be required.

All Pricing Firm for Thirty (30) Days from date of proposal.

Units shipped F.O.B. Factory with freight allowed to the first destination.
Payment Terms Net Thirty (30) Days.

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Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

Bullock, Logan & Associates, Inc.

"The Heat Transfer Specialists"

The above Proposal for Wheatlands School has been accepted. We agree to the amount on the above listed quotation based upon approved submittals. The above chiller is a Non-Stock Chiller and will be shipped 8 weeks after receipt of approved drawings. With receipt of this signed proposal we will start submittal documents. A purchase order made out to Bullock, Logan & Associates must follow shortly.

Accepted By: _____ Date: 5/08/14
Sign Name

Accepted By: _____ Title: _____
Print Name

We trust this information meets with your approval. Thanks again for thinking of us on this project and please contact us at anytime if you have questions or if we may be of any further assistance.

Very truly yours,
BULLOCK, LOGAN & ASSOCIATES, INC.
Manufacturer's Representatives for Smardt Inc.

Curt J. Bullock Jr.

Curt J. Bullock Jr.

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Elk Grove Village, IL 60007
Phone : 847-434-1200 Fax : 847-434-1195

SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Basic Electrical Requirements specifically applicable to Division 26 Sections, in addition to Division 01 - General Requirements.

1.03 REGULATORY REQUIREMENTS

A. Health/Life Safety Code for Public Schools - 23 Illinois Administrative Code 180 incorporating:

B. Provide all materials and labor in conformance with the following codes and standards:
   1. ANSI/NFPA 70 - National Electrical Code 2008 Edition as adopted and Amended by the Illinois School Code.
   2. IECC International Energy Conservation Code, 2009 Edition.
   3. International Fire Code, 2009 Edition.
   4. IEBC International Existing Building Code, 2009 Edition.
   5. Installation, Maintenance and Use of Protective Signaling Systems, 2007 Edition (NFPA 72).
   6. ADA-AG - American with Disabilities Act - Accessibility Guidelines.
   7. Illinois Accessibility Code (71 Ill Admin code 400).
   8. Underwriter's Laboratory.
   9. Install electrical Work in accordance with the NECA Standard of Installation.

1.04 DELIVERY, STORAGE AND HANDLING

A. Store and protect all materials as specified under the provisions of Section 01 60 00 and as specified herein.

B. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

C. Ship products to the job site in their original packaging. Receive and store products in a suitable manner to prevent damage or deterioration. Keep equipment upright at all times.

D. Investigate the spaces through which equipment must pass to reach its final destination. Coordinate with the manufacturer to arrange delivery at the proper stage of construction and to provide shipping splits where necessary.

1.05 PROJECT/SITE CONDITIONS

A. Install work in locations shown on Drawings, unless prevented by Project conditions. Drawings have omitted certain branch circuitry in areas for ease of reading. All branch circuitry is to be provided by Contractor.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from Architect/Engineer before proceeding as specified under modification procedures.

1.06 MODIFICATION PROCEDURES

A. Procedures for modification of Work are specified under the provisions of Section 01 20 00.

1.07 QUALITY ASSURANCE

A. Provide Work as required for a complete and operational electrical installation.

B. All products shall be designed, manufactured, and tested in accordance with industry standards. Standards, organizations, and their abbreviations as used hereafter, include the following:
   1. American National Standards Institute, Inc (ANSI).
   2. American Society for Testing and Materials (ASTM).
   3. National Electrical Manufacturers Association (NEMA).
   4. Underwriters Laboratories, Inc. (UL).

C. Install all Work in accordance with the NECA Standard of Installation.

1.08 SUBMITTALS

A. Submit all requested items in Division 26,27 & 28 Sections under provisions of Section 01 60 00.

1.09 SUBSTITUTIONS

A. Substitutions will be considered only as allowed within the provisions of Section 01 60 00.

1.10 PROJECT RECORD DOCUMENTS

A. Cooperate and assist in the preparation of project record documents under the provisions of Section 01 70 00.

1.11 CONSTRUCTION PROCEDURES

A. Construct Work in sequence with all other trades and Owner's schedule as specified under the provisions of Section 01 70 00.

B. Prepare Work as specified under the provisions of Section 01 70 00.

C. Provide cleaning as specified under provisions of Section 01 70 00.

1.12 TRENCHING, FILL AND COMPACTION

A. Provide trenching, fill and compaction for all work indicated on Drawings and specified in Division 26 sections. Perform work in accordance with Division 31 requirements.

1.13 TEMPORARY UTILITIES

A. Arrange with utility company and provide temporary lighting and power necessary for building construction and temporary structures. Perform work in accordance with Section 01 50 00 requirements.

1.14 PROJECT MANAGEMENT AND COORDINATION

A. Proper project management and coordination is critical for a successful project. Manage and coordinate the Work with all other trades in accordance with Section 01 30 00 requirements. Reliance on the Drawings and Specifications only for exact project requirements is insufficient for proper coordination.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 26 05 01
MINOR ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

1.03 SUMMARY

A. Section Includes:
   1. Electrical demolition: Remove electrical systems to mechanical eqiupment scheduled for demolition and as necessary to upgrade the electrical distribution system.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Beginning of demolition means installer accepts existing conditions.

C. Demolition Drawings are based on casual field observation and are intended to identify the limits of the construction site. Remove all electrical systems in their entirety in proper sequence with the Work.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service and Emergency Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner and Architect at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service. Disable system only to make switchovers and connections. Notify Owner, Architect/Engineer and local fire service at least 24

hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Disconnect and remove abandoned panelboards and distribution equipment.

F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

G. Repair adjacent construction and finishes damaged during demolition and extension work.

H. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

I. Relocate existing fire alarm devices affected by wall, ceiling and floor demolition.

J. Properly dispose of all ballast to approved ballast recycler. Do not land fill ballasts.

END OF SECTION

SECTION 26 05 19
CONDUCTORS AND DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Wiring Methods.
   2. Wire and Cable
   3. Wiring Devices and Wall Plates
   4. Wiring Connections.

1.02 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.

B. Products: Listed and classified by Underwriters Laboratories Inc. as a suitable for purpose specified as shown.

PART 2 PRODUCTS

2.01 WIRING METHODS

A. All locations: Building wire in raceway.

B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
   1. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet. Use minimum #10 AWG conductor wire in all the following locations:
      a. All programmable panel branch circuits (larger where indicated).
      b. All emergency lighting and exit branch circuits.

2.02 WIRE AND CABLE

A. Manufacturers:
   1. Okonite.
   2. Southwire.
   3. Collyer.

B. Building Wire:
   1. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation.
   2. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, stranded conductor (solid for device terminations).
   3. Control Circuits: Copper, stranded conductor, 600 volt insulation.
   4. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
   5. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.
   6. Use conductor not smaller than 12 AWG for power and lighting circuits.
   7. Use conductor not smaller than 16 AWG for control circuits.

C. Locations:
   1. Concealed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
   2. Exposed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
   3. Above Accessible Ceilings: Use only building wire with Type THHN insulation in raceway.
   4. Wet or Damp Interior Locations: Use only building wire with Type THWN insulation in raceway.
   5. Exterior Locations: Use only building wire with Type XHHW insulation in raceway.
   6. Underground Installations: Use only building wire with Type XHHW insulation in raceway.

2.03 WIRING DEVICES AND WALL PLATES

A. Duplex Convenience Receptacle: Nema 5-20R, duplex, specification grade.
   1. Hubbell.
   2. Bryant.
   3. Leviton.
   4. Color: Ivory.

B. GFCI Receptacle: Nema 5-20R, duplex, GFCI, specification grade.
   1. Hubbell Model GF-5362.
   2. Slater Model SIR-20-F.
   3. Eagle Model 647.
   4. Color: Ivory.

C. Decorative Cover Plate:
   1. Hubbell.
   2. Bryant.
   3. Leviton.
   4. Description: Ivory, metal.

D. Weatherproof die cast cover.
   1. Intermatic Model WP1030MC (Two-Gang).
   2. Intermatic Model WP1010MC (One-Gang).
   3. Approved Equal.

E. Special Purpose Receptacles:
   1. Hubbell.
   2. P & S.
   3. Leviton.
   4. Description: Nema configuration as shown on Drawings unless noted otherwise.

2.04 WIRING CONNECTIONS:

A. Make permanent splice connections to achieve no measurable temperature rise:
   1. Wire size up to #6 AWG: Spring wire cap.
   2. Over #6 AWG: Crimp type Compression connector. Rubber under wrap with insulated plastic tape over wrap.

B. Make terminations to achieve no measurable temperature rise:
   1. Wire size upto #6 AWG: Set screw type compression terminal lug.

2. Wire size over #6 AWG: Crimp type compression connector to spade lug.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that interior of building is physically protected from weather.

B. Verify that mechanical work which is likely to injure conductors has been completed.

C. Completely and thoroughly swab raceway system before installing conductors.

3.02 INSTALLATION

A. Neatly train and secure wiring inside boxes, equipment, and panelboards.

B. Use wire pulling lubricant for pulling 4 AWG and larger wires.

C. Route wire and cable as required to meet project conditions.
   1. Wire and cable routing indicated is approximate unless dimensioned.
   2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

D. Pull all conductors into raceway at same time.

E. Protect exposed cable from damage.

F. Neatly train and lace wiring inside boxes, equipment and panelboards.

G. Support cables above accessible ceilings to keep them from resting on ceiling tiles.

H. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.

I. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

J. Terminate spare conductors with electrical tape.

K. Do not share neutral conductor on load side of dimmers.

L. Install wiring devices in accordance with manufacturer's instructions.
   1. Install wall switches at height shown on drawings, OFF position down.
   2. Install convenience receptacles at height shown on drawings grounding pole on bottom.
   3. Install specific purpose receptacles at heights shown on Drawings.

M. Install wall plates flush and level.
   1. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
   2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

1.02 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
   1. For service upgrade, protect and reuse existing grounding electrode conductors and electrodes.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Separately Derived System Grounding:
   1. Separately derived systems include, but are not limited to:
      a. Transformers (except autotransformers such as buck-boost transformers).
   2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
   3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
   4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
   5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 05 19:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
      a. Clamps: Bronze.
   2. Unless otherwise indicated, use exothermic welded connections or compression connectors for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
   4. Manufacturers - Mechanical and Compression Connectors:
      a. Burndy: www.burndy.com.
      b. Harger Lightning & Grounding: www.harger.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   5. Manufacturers - Exothermic Welded Connections:
      a. Burndy: www.burndy.com.
      b. Cadweld, a brand of Erico International Corporation: www.erico.com.
      c. ThermOweld, a brand of Continental Industries, Inc: www.thermoweld.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as shown on the drawings.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.

C. Make grounding and bonding connections using specified connectors.

1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 05 53.

E. Provide grounding and bonding to NFPA 70. Provide maintenance grounding conductor jumper at water service.
1. Supplementary Grounding Electrode: Use driven ground rod @ switchboard.
2. Provide grounding and bonding at main switchboard, all separately derived systems and generator frame. Utilize building structure and water service as grounding electrodes.
3. Use 6 AWG minimum size, copper conductor to bond communications system grounding conductor to nearest effectively grounded metallic water pipe.
4. Provide isolated grounding conductor for circuits supplying computers and peripheral devices.

3.03 FIELD QUALITY CONTROL

A. Perform inspection in accordance with Section 01 40 00.

B. Inspect and test in accordance with NETA ATS except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

F. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

G. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point by passing minimum current of 10 amperes DC and measuring voltage drop. Maximum resistance: 5 ohms.

H. Measure primary and secondary transformer voltages and make appropriate tap adjustments.

END OF SECTION

SECTION 26 05 35
RACEWAYS AND BOXES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Raceway Requirements.
   2. Metallic Conduit and Fittings.
   3. Electrical Boxes.
   4. Penetration Sealants.
   5. Wireway.

1.02 REFERENCES

A. American National Standards Institute (ANSI)
   1. ANSI C80.1 - Specification for Rigid Steel Conduit, Zinc-Coated.
   2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc-Coated.

B. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

C. NECA "Standard of Installation"

D. Underwriter's Laboratory Fire Resistance Directory.

1.03 QUALITY ASSURANCE

A. Install all raceways in accordance with applicable building codes and NECA "Standard of Installation."

1.04 SUBMITTALS

A. Shop Drawings: Submit intended routing of all conduits exposed in rooms or under slab. Due to the exposed nature of this Work, careful lay-out procedures are necessary to provide an acceptable aesthetic appearance and to avoid crossing of conduits.

B. Submit Under Provisions of Section 01 78 00 - Contract Closeout:
   1. Project Record Documents:
      a. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.
      b. Accurately record re-arrangement of panel schedule at panelboards.
      c. Accurately record within a tolerance of 6 inches the location of all conduits greater than 3/4" trade size, all conduit homeruns, all underground and all in-slab conduits.

1.05 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at locations required for box to serve intended purpose. Include in base bid, installation within 10 feet of location shown.

PART 2 PRODUCTS

2.01 RACEWAY REQUIREMENTS

A. Use only specified raceway in the following locations:
   1. Branch Circuits and Feeders:
      a. Concealed Dry Interior Locations: Electrical metallic tubing.
      b. Exposed Dry Interior Finished Locations: Electrical metallic tubing.
      c. Exposed Dry Interior Unfinished Locations: Electrical metallic tubing.
      d. All other locations: Galvanized Rigid Metallic Conduit.

B. Size raceways for conductor type installed.
   1. Minimum Size Conduit Homerun to Panelboard: 3/4-inch.

2.02 METALLIC CONDUIT AND FITTINGS

A. Conduit:
   1. Rigid Steel Conduit: ANSI C80.1.
   2. Electrical metallic tubing: ANSI C80.3.
   3. Flexible Conduit: UL 1, zinc-coated steel.
      a. Liquidtight Flexible Conduit: UL360. Fittings shall be specifically approved for use with this raceway.

B. Conduit Fittings:
   1. Metal Fittings and Conduit Bodies: NEMA FB 1.
      a. EMT fittings: Use set-screw indentor-type fittings.

2.03 ELECTRICAL BOXES

A. Manufacturers:
   1. Raco.
   2. Steel City.
   3. Appleton.
   4. Substitutions: Or Approved Equal.

B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel, suitable for installation in masonry:

C. Equipment Support Boxes: Rated for weight of equipment supported; include 2 inch male fixture studs where required.

D. Wet Location Outlet Boxes: Cast aluminum: Cast alloy, deep type, gasket cover, threaded hubs.

2.04 PENETRATION SEALANTS

A. Fire-rated assemblies: Provide firestopping of all penetrations made by Work under this Contract in accordance with provisions of Section 07 84 00 requirements.

B. Thermal and Moisture Protection: Provide thermal and moisture protection made by Work under this Contract of all exterior wall, floor and roof penetrations in accordance with Division 7 requirements.

2.05 WIREWAY

A. Manufacturers:
   1. Hoffman.
   2. Cooper Industries.
   3. Approved Equal.

B. Description:
   1. NEMA Type 1 Lay-In Galvanized Wireway, UL 870. Flat cover design. Size as shown on drawings.
   2. Provide hinged covers where noted on drawings.
   3. Provide all elbows, tee's, covers and fittings as required

C. Finish:
   1. To be selected by Architect/Engineer.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that interior of building is physically protected from weather.

B. Verify that mechanical work which is likely to injure conductors has been completed.

C. Completely and thoroughly swab raceway system before installing conductors.

D. Verify that supporting surfaces are ready to receive work.

E. Electrical boxes are shown on Drawings, in approximate locations, unless dimensioned.
   1. Obtain verification from Architect/Engineer for locations of outlets throughout prior to rough-in.

F. Degrease and clean surfaces to receive wire markers.

3.02 INSTALLATION

A. Arrange conduit to maintain headroom and to present neat appearance.
   1. Route raceway parallel and perpendicular to walls and adjacent piping.
   2. Maintain minimum 6 inch clearance to piping and 12 inch clearance to heat surfaces such as flues and heating appliances.
   3. Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.
   4. Use conduit hangers and clamps; do not fasten with wire or perforated pipe straps.
   5. Use conduit bodies to make sharp changes in direction.
   6. Terminate conduit stubs with insulated bushings.
   7. Use suitable caps to protect installed raceway against entrance of dirt and moisture.
   8. Install expansion joints where raceway crosses building expansion joints.

B. Install electrical boxes as shown on the drawings, and as required for splices, taps, wire pulling, equipment connections and regulatory requirements.
   1. Locate and install electrical boxes to allow access. Provide access panels if required.
   2. Locate and install electrical boxes to maintain headroom and to present neat mechanical appearance.
   3. Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.
   4. Provide knockout closures for unused openings.
   5. Coordinate mounting heights and locations of outlets above counters, benches, backsplashes and furniture.

C. Use recessed outlet boxes in finished areas and where indicated.
   1. Secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness.
   2. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
   3. Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes.
   4. Do not install boxes back-to-back in walls; provide 6 inches separation, minimum; except provide 24 inches separation, minimum in acoustic-rated walls.
   5. Do not damage insulation.

D. Install conduit to preserve fire resistance rating of walls, floors, partitions and other elements, using materials and methods recognized by Underwriters Laboratory Fire Resistance Directory.

E. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

F. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

G. Do not use powder-actuated anchors.

H. Cut or core structural members and thermal and moisture barriers only upon receiving permission from Architect. Each Contractor shall be responsible for making necessary penetrations for the completion of it's Work.

I. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 06 20.26
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment and devices not an integral part of the electrical distribution system.

1.02 REFERENCE STANDARDS

1.03 ADMINISTRATIVE REQUIREMENTS

A. Provide conduit rough-in and electrical connection to powered equipment and devices identified in the Project Manual and on the Drawings. Refer specifally, but not limited to, these Specification Sections for further information:
   1. Section 23 05 19 - Instrumentation and Control Devices for HVAC
      a. Variable Frequency Drives
      b. Refrigerant Detection Systems
   2. Section 23 21 14 - Hydronic Pumps
      a. Boiler Pumps
   3. Section 23 34 23 - HVAC Power Ventilators
      a. Exhaust Fans
   4. Section 23 52 30.13 - FIre-Tube Boilers
      a. Boilers
   5. Section 23 64 16 - Centrifugal Water Chillers
      a. Chillers

B. Coordination: Determine connection locations and requirements.

C. Sequencing:
   1. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
   2. Sequence electrical connections to coordinate with start-up schedule for equipment.

PART 2 PRODUCTS

2.01 Not Used

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.

D. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is necessary.

E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

F. Install disconnect switches, controllers, control stations, and control devices for all equipment.

G. Modify equipment control wiring with terminal block jumpers as directed by manufacturer's installation instructions.

H. Provide interconnecting conduit and wiring between devices and equipment as directed by manufacturer's installation instructions.

I. Cooperate and assist Owner and other trades in the start-up of all equipment as specified under the provision of Section 01 40 00 - Quality Requirements.

3.03 ELECTRICAL CONDUIT ROUGH-IN

A. Obtain manufacturer's installation instructions and rough-in electrical conduit system as detailed in manufacturer's installation instructions.

B. Extend conduit to accessible ceiling locations where complete conduit system is not required.

END OF SECTION

SECTION 26 24 13
SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Enclosed Switches.
   2. Grounding Materials.
   3. Fuses.
   4. Distribution Switchboards.
   5. Distribution Panelboards.
   6. Meter transformer cabinets.
   7. Circuit Breakers.
   8. Modifications to Motor Control Center.
   9. Motor Starters.
   10. Dry-Type Transformers.
   11. Single Pole Fused Switches.
   12. Single Pole Motor Rated Switches.

1.02 SYSTEM DESCRIPTION

A. Electric Service System: Single point (one) service entrance location. Underground service with secondary metering.

B. Existing Grounding Electrode System:
   1. Metal underground water pipe.
   2. Rod electrode.
   3. Metal frame of building.

1.03 SUBMITTALS

A. Submit Under Provisions of Division 01 - Submittals:
   1. Shop Drawings: Indicate relevant information on panelboards and transformers.
   2. Product Data: Provide data on enclosed switches and circuit breakers, fuses and panelboard circuit breakers.
      a. For circuit breakers feeding transformers, provide circuit breaker time-current curves overlayed with transformer inrush, FLA and primary/secondary thermal limit curves.
   3. Wiring Diagrams: Submit wiring diagrams for all exit sign, night light, self-contained back-up battery lighting, battery ballasts and associated circuit breakers, programmable circuit breakers and/or emergecy circuit breakers.
   4. Test Reports: Submit for field inspection and testing. Include description of procedures, duration, instruments used, and test values obtained. Present information in table comparing acceptable values to actual values:
      a. Indicate overall resistance to ground and resistance of each electrode.
      b. Indicate final phase balance values for all panelboards, including neutral.
   5. Operating and Maintenance Instructions:
      a. Panelboard: Submit NEMA PB 2.1.

B. Submit Under Provisions of Section 01780 - Contract Closeout:
   1. Test Reports: Submit for field inspection and testing. Include description of procedures, duration, instruments used, and test values obtained. Present information in table comparing acceptable values to actual values.
      a. Indicate overall resistance to ground and resistance of each electrode.
      b. Indicate final phase balance values for all panelboards, including neutral.
   2. Operating and Maintenance Instructions:
      a. Panelboard: Submit NEMA PB 2.1.
   3. Project Record Documents:
      a. Accurately record actual locations of grounding electrodes.
      b. Record actual locations of Panelboards, indicate actual branch circuit arrangement.

1.04 QUALITY ASSURANCE

A. Ground System Resistance: 5 ohms.

B. Phase balance per panelboard: 10 percent.

C. All panelboards shall be of same manufacturer for ease of future maintenance.

1.05 REFERENCES

A. NECA (National Electrical Contractors Association) "Standard of Installation."

B. NEMA PB 1 - Panelboards.

C. NEMA KS 1 - Enclosed Switches.

D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

PART 2 PRODUCTS

2.01 ENCLOSED SWITCHES

A. Manufacturers:
   1. Square D.
   2. General Electric.
   3. Siemens.
   4. Substitutions: Or Approved Equal.

B. Fusible Switch Assemblies: NEMA KS 1, Type HS or GS, horsepower rated, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate Class R fuses when used.

C. Nonfusible Switch Assemblies: NEMA KS 1, Type HS or GS, horsepower rated, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in the OFF position.

D. Enclosures:
   1. Interior Dry Locations: Type 1.

2. Exterior Locations: Type 3R.

2.02 FUSES

A. Manufacturers:
   1. Bussman.
   2. Gould/Shawmut.
   3. Littel-Fuse.

B. Type:
   1. Motor overcurrent protection: Class RK5, Time Delay.
   2. Feeder circuit: Class J, Fast Acting.
   3. Circuit Breaker Back-up: Class J, Fast Acting.
   4. Service Entrance: Class L, 4 second delay.

2.03 DISTRIBUTION SWITCHBOARDS

A. Manufacturers:
   1. Square D.
   2. General Electric.
   3. Siemens.
   4. Substitutions: Or Approved Equal.

B. Main Service Entrance Switchboards Description: NEMA PB-2, UL891, group mounted, class 1, front accessible with zero sequence ground fault detection, NEMA 1 enclosure, service entrance rated. Refer to panel schedule and Drawings for further information. Dimensions of enclosure to match existing equipment scheduled to be removed.
   1. Section 1: Combination meter/mains:
      a. Utility: Commonwealth Edison Co. approved, with NEMA 1 CECHA approved meter fitting and control wiring. Suitable for 2000:5 current transformers. Locate meter fitting at building electrical room as approved by utility company.
   2. Accessibility: Front accessible only.

C. Bussing: Shall be copper (all phases, neutral and ground). Provide bus connection from main device to existing Section 2.

D. Bus Connections: Bolted, accessible from front for maintenance.

E. Ground Bus: Extend length of switchboard.

F. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Provide continuous current rating as indicated.

G. Breakers: Provide fixed thermal magnetic trip molded case breakers branch devices as indicated on Drawings.

H. Concrete Curb: Provide concrete curb for free standing equipment.

2.04 MOTOR CONTROL CENTER MODIFICATIONS

A. Manufacturers:

1. Existing: Siemens Style No. 95BSH739Z001

B. RATINGS
1. Provide motor control center components compatible with existing equipment and , manufactured and tested in accordance with NEMA ICS-2 and UL 845.
2. NEMA Classification: Class 1, type B.
3. Service: 208 volt, 3 phase, 3 wire, 60 Hz. Ampacity and configuration as indicated on Drawings.
4. Short Circuit: device interrupting and bus bracing is 42,000 rms symmetrical, fully rated.
5. Enclosure: NEMA 1A gasketed and painted in the manufacturer=s standard grey over a rust inhibitor treatment.

C. STARTER UNITS
1. Starters: Fusible switch combination type rated in accordance with NEMA size designations with integral control power. Fractional sizes and ratings per IEC recommendations are not acceptable.
2. Contactors: NEMA Size 1 minimum unless noted otherwise, magnetically held, field replaceable coil and contacts. Auxiliary contacts field installable and removable. Terminal temperature rise is not to exceed 50 degrees C. per NEMA standards.
3. Overload relays: Bimetallic or melting alloy type, normally open, isolated auxiliary contact, manually reset by means for an external resent button, and capable of handling the horsepower range of the starter by changing the thermal elements only.
4. Units: Constructed to fully compartmentalize the starter and arranged to permit access to starter, control power transformer, fuses, and other components without requiring disassembly. Equip unit door with a defeatable interlock to prevent opening unless the disconnect is open.
   a. NEMA size 1 thru 4: plug in.
5. Terminal blocks: Pull apart type for power and control to allow unit withdrawal without disconnecting wiring. Use screw type terminals suitable for ring and tongue lugs for control wiring and box lug type for power wiring.
6. Control Circuits: #14 AWG control wiring. Provide integral control power transformer, coordinate control voltage contact ratings with field motor control voltage circuit.

D. FEEDER UNITS
1. Breakers: Molded case type, thermal - magnetic trips meeting UL 489 and NEMA AB 1. Ampere rating and interrupting ratings as noted and field verified.
2. Units: Individually compartmentalized with not more than one breaker per unit.

E. RELAYING AND CONTROL DEVICES
1. Indicating lights and selectors: Heavy duty, oiltight, industrial grade with octagonal ring Hand-Off-Auto selector switch. Pilot lights are transformer type with 6 volt incandescent lamps.

2.05 MOTOR STARTERS

A. Magnetic Motor Starters: Nema ICS 2; AC general-purpose Class A magnetic controller for induction motors rated in horsepower with integral disconnect switch. Starter size and voltage as indicated on Drawings.

B. Full Voltage Starting: Non-reversing type.
1. Selector Switches: NEMA ICS 2; Hand/Off/Auto

2. Pushbuttons: NEMA ICS 2; Start/Stop - Hand Mode

C. Coil Operating voltage: Match with temperature control voltage.

D. Size: As indicated on Drawings.

E. Overload Relay: Nema ICS 2; bimetal.

F. Enclosure: Nema ICS 6; Type 1.

G. Auxiliary contacts: NEMA ICS 2; two field convertible contacts in addition to seal-in contact.

H. Indicating Lights: Nema ICS 2; RUN: green in front cover.

I. Control Power Transformer: 100 VA with secondary voltage to match temperature control voltage.

2.06 DRY TYPE TRANSFORMER

A. Manufacturers:
1. Square D.
2. General Electric.
3. Siemens.
4. Substitutions: Or Approved Equal.

B. Description: Specially designed for step up applications, minimize magnetization inrush current. UL K-4 rated, NEMA ST 20, factory-assembled, air-cooled dry type transformer.

C. Insulation system and average winding temperature rise for rated KVA as follows:
1. Class 220 with 115 degree C rise.

D. Case Temperature: Do not exceed 35 degrees C rise above ambient at hottest spot.

E. Basic Impulse Level: 10 KV.

F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

G. Winding Taps:
1. Transformers 15 kVA and Larger: NEMA ST 20.

H. Mounting: Suitable for floor mounting.

I. Enclosure: NEMA ST 20; Type 1.
1. Provide lifting eyes or brackets.

J. Electrostatic Shield: Copper, between primary and secondary windings.

K. Isolate core and coil from enclosure using vibration-absorbing mounts.

L. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

2.07 SINGLE-POLE FUSED SWITCHES

A. Manufacturers:
1. Fusetron SSW.
2. Substitutions: Or Equal.

B. Description: Combination switch and fuseholder. Provide fuse.

C. Enclosure: NEMA 1, suitable for use in return air plenum where applicable.

2.08 SINGLE-POLE MOTOR RATED SWITCHES

A. Manufacturers:
   1. Square D.
   2. General Electric.
   3. Siemens.
   4. Substitutions: Or Approved Equal.

B. NEMA ICS 2; AC general purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, toggle operator.
   1. Voltage: 120 Volt.

C. Enclosure: NEMA 1, suitable for use in return air plenum where applicable.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Make arrangements with Utility Company to obtain permanent electric service to the Project.

B. Provide concrete pad and pad grounding for Utility transformer under provisions of Section 03300. Provide pad dimensions and details to Utility requirements.

C. Temporary connection: Provide temporary connection from existing utilty transformer to main service section 2 to minimize downtime at service upgrade.

3.02 INSTALLATION

A. Install service in accordance with Utility instructions.
   1. Underground: Install service lateral conductors in existing spare conduit from Utility's pad-mount transformer to building service entrance equipment. The Utility Co. will connect the secondary (service lateral) conductors to the transformer secondary lugs.

B. Install equipment in accordance with manufacturer's instructions.

C. Install proper fuses in each fused switch.

D. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

E. Install panelboards to NEMA PB 1.1.

F. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

G. Provide engraved plastic nameplates.

H. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

I. Service equipment must be legibly field-marked with the maximum available fault current, including the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved.

J. Field mark electrical equipment to warn qualified persons on the danger of electric arc flash. The field-marking must be clearly visible to qualified persons before they inspect or work on the equipment.

K. Mount floor mounted transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure.
   1. Use flexible conduit for connection to transformer case.

3.03 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point by passing minimum current of 10 amperes DC and measuring voltage drop. Maximum resistance: 5 ohms.

C. Measure primary and secondary transformer voltages and make appropriate tap adjustments.

3.04 CLEANING

A. Clean equipment finishes to remove paint and concrete splatters.

END OF SECTION

SECTION 00 91 02
ADDENDUM NUMBER 2

DATE: **JUNE 02, 2014**

PROJECT: **THE WHEATLANDS AND FOX CHASE SCHOOLS - HVAC RENOVATIONS**
2290 W BARRINGTON DRIVE, AURORA, ILLINOIS 60503
260 FOX CHASE DRIVE N, OSWEGO, ILLINOIS 60543

PROJECT NO: **14-158-901**

OWNER: **OSWEGO COMMUNITY UNIT SCHOOL DISTRICT 308**
4175 ROUTE 71
OSWEGO, ILLINOIS 60543

TO: **PROSPECTIVE BIDDERS / PLANHOLDERS OF RECORD**

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated May, 20, 2014, with amendments and additions noted below. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of one (1) page and Drawings E300 and E301.

CHANGES TO THE DRAWINGS

1.01 DRAWING E300 - THE WHEATLANDS FIRST AND SECOND FLOOR ELECTRICAL PLANS

A. Delete this Drawing in its entirety and replace with revised Drawing E300 (attached). This revised Drawing depicts the actual correct location of the power and lighting panels and the main distribution panels.

1.02 DRAWING E301 - FOX CHASE FIRST AND SECOND FLOOR ELECTRICAL PLANS

A. Delete this Drawing in its entirety and replace with revised Drawing E301 (attached). This revised Drawing depicts the actual correct location of the main distribution panels.

END OF DOCUMENT

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