

**SECTION 00 01 01  
PROJECT TITLE PAGE**

**PROJECT MANUAL**

**FOR**

**NORTH AURORA POLICE DEPARTMENT HVAC CONTROLS  
200 S. LINCOLNWAY  
NORTH AURORA, ILLINOIS 60542**

**OWNER**

**VILLAGE OF NORTH AURORA  
25 E. STATE STREET  
NORTH AURORA, ILLINOIS 60542**

**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. MECHANICAL ENGINEER**

**END OF DOCUMENT**

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**SECTION 00 01 15  
DRAWING INDEX**

**GENERAL**

G100 COVER SHEET, GENERAL NOTES, SYMBOLS & DRAWING INDEX

**MECHANICAL**

M310 POLICE DEPARTMENT FLOOR  
M311 FIRING RANGE FLOOR PLAN AND ROOF PLAN  
M320 POLICE DEPARTMENT ROOF PLAN  
M410 TEMPERATURE CONTROLS  
M411 TEMPERATURE CONTROLS  
M412 TEMPERATURE CONTROLS  
M413 TEMPERATURE CONTROLS  
M510 MECHANICAL SCHEDULES

**END OF DOCUMENT**

**SECTION 00 11 13  
ADVERTISEMENT FOR BIDS**

**PROJECT:** NORTH AURORA POLICE DEPARTMENT HVAC CONTROLS  
200 S. LINCOLNWAY  
NORTH AURORA, ILLINOIS 60542

**OWNER:** VILLAGE OF NORTH AURORA  
25 E. STATE STREET  
NORTH AURORA, ILLINOIS 60542

**ARCHITECT/  
ENGINEER:** KLUBER ARCHITECTS + ENGINEERS  
10 S. SHUMWAY AVENUE  
BATAVIA, ILLINOIS 60510

**DESCRIPTION OF THE WORK:**

The Owner will receive bids for the removal of the existing Trane controls system and replacement with an open protocol temperature controls system at the North Aurora Police Department. The Work will include: temperature controls and electrical work

**BASIS OF BIDS:**

Bids will be a single contract, stipulated sum.

**TIME OF COMPLETION:**

The Work will commence on Monday, February 13, 2017, 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 10:00 a.m. on Monday, January 23, 2017 in a sealed envelope addressed with the name of the Bidder, Owner, name and number of Contract, and the date and time of the Bid. Deliver to the Village of North Aurora, 25 East State Street, North Aurora, Illinois 60542. 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 downloaded free of charge online at <http://northaurora.org/government/rfp-rfq-bidding.aspx> after 8:00 a.m. on Thursday, January 5, 2017.

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

**BID SECURITY:**

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

**PRE-BID MEETING:**

A pre-bid meeting and site walk through will be held at North Aurora Police Department, 200 S. Lincolnway at 2:00 p.m. on Monday, January 16, 2017. This is a mandatory meeting. Failure to attend may lead to the disqualification of the bid.

**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 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. Board Approval of Contractor Bid: February 6, 2017.
- B. Finalize Contract, Contractor forms and Insurance: February 13, 2017.
- C. Commencement of Construction: February 13, 2017.
- D. Substantial Completion: May 8, 2017.

**END OF DOCUMENT**



**SECTION 00 41 13  
BID FORM - STIPULATED SUM  
SINGLE CONTRACT**

**PROJECT:**           **NORTH AURORA POLICE DEPARTMENT HVAC CONTROLS  
200 S. LINCOLNWAY  
NORTH AURORA, ILLINOIS 60542**

**BID TO:**           **VILLAGE OF NORTH AURORA  
25 E. STATE STREET  
NORTH AURORA, ILLINOIS 60542**

**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 CONTRACT TIME**

A. The Bidder agrees to begin and complete Work as indicated in Document 00 31 13 - Preliminary Schedule.

**1.06 OTHER BID FORM SUPPLEMENTS**

A. The following additional Documents are attached to and made a condition of this Bid:

1. Document 00 43 14 - Contractor Registration.
2. Document 00 45 13 - Bidder's Qualifications.
3. Document 00 45 46.01 - Contractor's Certification of Legal Eligibility for Bidding.
4. Document 00 45 46.02 - Contractor's Drug-Free Workplace Certification.
5. Document 00 45 46.03 - Sexual Harassment Certificate.

**1.07 SIGNATURES**

A. Respectfully submitted this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

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 Architect/Engineer's office or purchased at the American Institute of Architects, <http://www.aia.org/contractdocs/>.

**END OF DOCUMENT**

**SECTION 00 43 14  
BID FORM SUPPLEMENT - BIDDERS CERTIFICATION**

**1.01 VILLAGE OF NORTH AURORA APPLICATION FOR CONTRACTOR REGISTRATION FORM  
ATTACHED (2 PAGES).**

**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:

Name Background Years in Contracting Current Workload

\_\_\_\_\_  
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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 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 00 01 01, 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 \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public

**END OF DOCUMENT**





Village of North Aurora  
25 E. State Street  
North Aurora, Illinois 60542

[www.vil.north-aurora.il.us](http://www.vil.north-aurora.il.us)

Community Development  
Phone: (630) 897-1457  
Fax: (630) 897-0269

## APPLICATION FOR CONTRACTOR REGISTRATION

GENERAL CONTRACTOR \_\_\_\_ SUB-CONTRACTOR \_\_\_\_ (INCLUDE GENERAL CONTRACTOR'S NAME)

\_\_\_\_ PLUMBING/ROOFING REGISTRATION \_\_\_\_

NAME OF FIRM: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_ FAX NO. \_\_\_\_\_ CELL NO. \_\_\_\_\_

E-MAIL \_\_\_\_\_ CONTACT: \_\_\_\_\_

CITY ELECTRICAL STATE ROOFING/PLUMBING LIC. # \_\_\_\_\_  
(Attach a copy to this application)

TYPE OF BUSINESS: \_\_\_\_\_

BUSINESS OWNER'S NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_ FAX NO. \_\_\_\_\_

INSURANCE AGENT: \_\_\_\_\_ PHONE: \_\_\_\_\_

E-MAIL \_\_\_\_\_

PROOF OF INSURANCE SUBMITTED

PROOF OF BONDING SUBMITTED  
(\$20,000)

FEE SUBMITTED:  \$150.00  OR \$25.00 (STATE PLUMBING or ROOFING LICENSE  
HOLDERS)

NO REGISTRATION SHALL BECOME EFFECTIVE UNTIL SUCH DATE AS THE REQUIRED PROOF  
OF INSURANCE AND OR BONDING HAS BEEN SUBMITTED AND IS ON FILE WITH THE VILLAGE.

(OVER)

INSURANCE AND BONDING MUST BE MAINTAINED THROUGHOUT REGISTRATION PERIOD OR REGISTRATION WILL BE SUSPENDED OR REVOKED.

I HEREBY CERTIFY THAT I AM FAMILIAR WITH ALL THE PERTINENT VILLAGE ORDINANCES, CODES AND REGULATIONS INCLUDING THE BUILDING CODE APPLICABLE TO THE BUSINESS THAT I AM ENGAGED IN AND THAT I AGREE TO COMPLY WITH SAME.

---

OWNER OR AUTHORIZED PERSON'S SIGNATURE

DATE

**FOR OFFICE USE ONLY**

LICENSE NO. \_\_\_\_\_

FEE RECEIVED: \_\_\_\_\_

DATE ISSUED: \_\_\_\_\_

EXPIRATION DATE: \_\_\_\_\_

PROOF OF INSURANCE SUBMITTED: \_\_\_\_\_

PROOF OF BONDING SUBMITTED: \_\_\_\_\_

**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 Village of North Aurora 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 this Section.
- B. Failure to abide by this certification shall subject the contractor to the penalties provided in Section 6 (30 ILCS 580/6) of the Act.
- C. Notice: This Contractor's Drug Free 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 thereof, directly responsible for the performance of a contract of \$5,000 or more with the Village of North Aurora.

\_\_\_\_\_  
Name of Contractor

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

Its: \_\_\_\_\_

ATTEST:

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

Its: \_\_\_\_\_

DATED: \_\_\_\_\_

#### **1.02 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 Village of North Aurora that it will not engage in the unlawful manufacture, distribution, possession 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 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 Village of North Aurora.

\_\_\_\_\_  
Name of Individual

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

DATED: \_\_\_\_\_

**END OF DOCUMENT**

**SECTION 00 45 46.03  
SEXUAL HARASSMENT CERTIFICATE**

\_\_\_\_\_ hereinafter referred to as "Contractor" hereby certifies that said Contractor has a written sexual harassment policy in place in full compliance with 775 ILCS 5/2-105(A)(4) including the following information:

1. An acknowledgment of the illegality of sexual harassment.
2. The definition of sexual harassment under State law.
3. A description of sexual harassment, utilizing examples.
4. The contractor's internal complaint process including penalties.
5. The legal recourse, investigative and complaint process available through the Illinois Department of Human Rights and the Human Rights Commission.
6. Directions on how to contact the Department of the Commission.
7. An acknowledgment of protection of a complaint against retaliation as provided in Section 6-101 of the Human Rights Act.
8. Each contractor must provide a copy of such written policy to the Illinois Department of Human Rights upon request.

By: \_\_\_\_\_  
Authorized Agent of Contractor

Subscribed and sworn to before me

this \_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public

**END OF DOCUMENT**

**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/contractdocs/>.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 72 00 - General Conditions.
- B. Document 00 73 00 - Supplementary Conditions.

**END OF DOCUMENT**

**SECTION 00 60 00  
PROJECT FORMS**

**1.01 FORMS OF BONDS AND CERTIFICATES**

- A. Performance and Payment Bonds: AIA Document A312 - Performance Bond and Payment Bond.
- B. Consents of Surety:
  - 1. AIA Document G707A - Consent of Surety to Final Reduction in or Partial Release of Retainage.
  - 2. AIA Document G707 - Consent of Surety to Final Payment.
- C. The above documents may be examined at the Architect's office or purchased at the American Institute of Architects, <http://www.aia.org/contractdocs/>.

**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/contractdocs/>.

**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 SECTION**



**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 Owner shall furnish to the Contractor one (1) PDF copy of the Contract Documents for the purposes of making reproductions pursuant to Section 1.5.2."

- 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, prior to the submission of its bid, the Contractor (a) has visited and examined the Project site and is familiar with all of the conditions thereon; (b) has examined the nature, location and character of the general area in which the Project is located, including, without limitation, its climactic conditions, available labor supply, labor costs and available equipment supply and costs; and (c) has examined the quality and quantity of 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 Section 01 60 00 - Product Requirements.

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 in its entirety and replace with the following:

**"§ 3.6 TAXES**

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 3.7.1 in its entirety.

"§ 3.7.1 The Owner shall pay for the building permit. The Contractor shall obtain the building permit and shall obtain and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded."

2. 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 the Architect with Contractor's Application 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 be 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 or the schedule. The Owner may, at 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 the 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:

"§ 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 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:

- .1 For the Contractor, for any Work performed by the Contractor's own forces: 10 percent of the cost.
- .2 For the Contractor, for Work performed by his Subcontractor: 5 percent of the amount due the Subcontractor.
- .3 For each Subcontractor or Sub-subcontractor involved, for any Work performed by the Subcontractor's own forces: 10 percent of the cost.
- .4 For each Subcontractor, for Work performed by his Sub-subcontractors: 5 percent of the amount due the Sub-subcontractor.
- .5 All proposals, except those less than \$200.00, shall be accompanied by a complete itemization of costs including labor, materials and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also. In no case will a change involving over \$200.00 be approved without such itemization."

**B. § 7.3 CONSTRUCTION CHANGE DIRECTIVES**

1. In the first sentence of Section 7.3.7, 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".

**1.06 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.

## 1.07 ARTICLE 11 INSURANCE AND BONDS

### A. § 11.1 CONTRACTOR'S LIABILITY INSURANCE

1. 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;"
2. 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;"
3. 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."
4. 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"
5. 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:

VILLAGE OF NORTH AURORA  
25 E. STATE STREET

NORTH AURORA, ILLINOIS 60542

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

6. 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"."
7. 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."
8. Add new Section 11.1.5 as follows:

"§ 11.1.5 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 fourth sentence of Section 11.3.9 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:

VILLAGE OF NORTH AURORA  
25 E. STATE STREET  
NORTH AURORA, ILLINOIS 60542

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

## **1.08 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 to 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:

"**§ 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."

## **1.09 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 The Contractor and all Subcontractors shall pay prevailing wages as established by the Illinois Department of Labor for each craft or type of work needed to execute the contract in accordance with the Prevailing Wage Act (820 ILCS 130/0.01 et seq.). The Contractor shall prominently post the current schedule of prevailing wages at the Contract site and shall notify immediately in writing all of its Subcontractors, of all changes in the schedule of prevailing wages. Any increases in costs to the Contractor due to changes in the prevailing rate of wage during the terms of any contract shall be at the expense of the Contractor and not at the expense of the Owner. The change order shall be computed using the prevailing wage rates applicable at the time the change order work is scheduled to be performed. The Contractor shall be solely responsible for maintain accurate records as required by the prevailing wage statute and shall be solely liable for paying the difference between prevailing wages and any wages actually received by laborers, workmen and/or mechanics engaged in the Work.

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."

**1.10 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 Subcontractor 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 including 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' and 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: NORTH AURORA POLICE DEPARTMENT HVAC CONTROLS.
- B. Owner's Name: Village of North Aurora.
- C. Architect/Engineer's Name: Kluber Architects + Engineers.
- D. The Project consists of the removal of exiting Trane building automation system of North Aurora Police Department. Provide new open protocol web-based direct digital building automation system.

**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 WORK**

- A. HVAC: Replace existing system with new construction, keeping existing in operation until ready for changeover.

**1.04 OWNER OCCUPANCY**

- A. Owner intends to continue to occupy the existing building 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.

**1.05 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas as coordinated with Owner.
- B. Contractors will be required to submit information for each worker to North Aurora Police Department for background check.
- C. The building has restricted areas that will require an escort for access. Contractor shall schedule work in these areas with owner and provide 72 hours advance notice before the area requires access.
- D. 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.
- E. Existing building spaces may not be used for storage.
- F. Time Restrictions:
  - 1. Limit conduct of the hours of as directed by Owner.

G. Utility Outages and Shutdown:

1. 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.
2. Prevent accidental disruption of utility services to other facilities.

**1.06 WORK SEQUENCE**

A. Construct Work in stages during the construction period:

B. 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, monetary values of unit prices.
- 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.

**1.03 SCHEDULE OF VALUES**

- A. Form to be used: AIA G703.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect/Engineer for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values to the Architect/Engineer at earliest possible date, but no later than 14 days prior to first Pay Request Meeting.
  - 1. After review by the Architect/Engineer, 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:
  - 1. Bonds.
  - 2. Insurance.
  - 3. Site Mobilization.
  - 4. Construction Submittals.
  - 5. General Conditions.
  - 6. Demonstration and Training.
  - 7. 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 and G703.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect/Engineer 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 to the Architect/Engineer at least 7 days prior to the due date for the submission of the Application.
- J. Contractor or Architect/Engineer 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 Application for Payment as well as trailing partial waivers of lien for subcontractors and suppliers who were included in the previous Application 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 suitably 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 Architect/Engineer 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, Architect/Engineer will issue instructions directly to Contractor.
- C. For other required changes, Architect/Engineer will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect/Engineer 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 ten (10) days.
- E. Contractor may propose a change by submitting a request for change to Architect/Engineer, 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 Architect/Engineer 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 Architect/Engineer.
  3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  4. For change ordered by Architect/Engineer without a quotation from Contractor, the amount will be determined by Architect/Engineer based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect/Engineer 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 Section 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 30 00  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Submittals for review and project closeout.
- E. 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. Architect/Engineer will schedule a meeting after Notice of Award.
- B. Attendance required:
  - 1. Owner.
  - 2. Architect/Engineer.
  - 3. 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 Architect/Engineer.
  - 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 Architect/Engineer, Owner, participants, and those affected by decisions made.

### **3.02 PROGRESS MEETINGS**

- A. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect/Engineer.
- C. 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. Maintenance of progress schedule.
  - 7. Corrective measures to regain projected schedules.
  - 8. Planned progress during succeeding work period.
  - 9. Maintenance of quality and work standards.
  - 10. Effect of proposed changes on progress schedule and coordination.
  - 11. Other business relating to Work.
- D. Record minutes and distribute copies within 2 days after meeting to participants, with copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

### **3.03 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 7 days after date of the Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 7 days.
- C. Submit updated schedule with each Application for Payment.

### **3.04 Submittals FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
  - 2. Shop drawings.
- B. Submit to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. 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.

### **3.05 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.

### **3.06 NUMBER OF COPIES OF Submittals**

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

### **3.07 Submittal PROCEDURES**

A. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each Submittal with a copy of approved Submittal form.

C. Transmit each Submittal with AIA Form G810.

D. Sequentially number the transmittal form. Revise Submittals with original number and a sequential alphabetic suffix.

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

F. 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.

G. Deliver Submittals to Architect/Engineer at business address.

H. Schedule Submittals to expedite the Project, and coordinate submission of related items.

I. For each Submittal for review, allow 20 days excluding delivery time to and from the Contractor.

J. 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.

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

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

M. 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.

N. Provide space for Contractor and Architect/Engineer review stamps.



- O. 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.
- P. The Contractor is entitled to 1 Resubmittals of any Shop Drawing, Product Data, or Closeout Submittal item rejected by the Architect or returned by the Architect for further action. Thereafter, the Contractor shall pay the cost of all further Architect'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.
- Q. Distribute reviewed Submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- R. Submittals not requested will not be recognized or processed.
- S. 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**

**SECTION 01 40 00  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Control of installation.

**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 E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).
- B. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2010.
- C. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2008.
- D. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2010a.
- E. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2010b.
- F. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2009.
- G. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2011.
- H. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2010.
- I. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2008) .
- J. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2010.
- K. ASTM C1357 - Standard Test Methods for Evaluating Masonry Bond Strength; 2009.
- L. ASTM E514 - Standard Test Method for Water Penetration and Leakage Through Masonry ; 2009.
- M. ASTM E165 - Standard Test Method for Liquid Penetrant Examination; 2009.

## **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect/Engineer's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect/Engineer, in quantities specified for Product Data.
  - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

## **1.05 REGULATORY REQUIREMENTS - See Section 01 41 00**

## **1.06 REFERENCES AND STANDARDS - See Section 01 42 00**

## **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 Architect/Engineer 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. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

**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 Architect/Engineer immediately. Architect/Engineer 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 Architect/Engineer, 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. ICC Electrical Code, 2000 Edition.
  2. State code requirements:
    - a. Capital Development Board (CDB):
      - 1) Illinois Accessibility Code, 1997 Edition.
      - 2) Illinois Energy Conservation Code (ICC International Energy Conservation Code, 2012 Edition, with State of Illinois modifications.
    - b. Illinois Department of Labor (IDOL): Safety Glazing Materials Act - Illinois Revised Statutes, chap. 111 1/2, paragraph 3101, et seq.
    - c. Illinois Department of Public Health (IDPH):
      - 1) Illinois Plumbing Code (Illinois Administrative Code, Title 77, Chapter I, Subchapter r, Part 890).
    - d. 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 Sewage Works (Illinois Administrative Code, Title 35, Subtitle C, Chapter II, Part 370).
    - e. 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 Architect/Engineer", no implied meaning shall be construed to extend the Architect/Engineer's responsibilities into the Contractor's purview of construction supervision.
- C. Where the term "approved" is used in conjunction with the Architect/Engineer's action on submittals, requests or applications it is limited to the duties of the Architect/Engineer 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 (:) is 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 Architect/Engineer before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect/Engineer 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. AABC -- ASSOCIATED AIR BALANCE COUNCIL
- B. AGA -- AMERICAN GAS ASSOCIATION
- C. ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE
- D. ARI -- AIR-CONDITIONING AND REFRIGERATION INSTITUTE
- E. ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
- F. ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
- G. CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
- H. FM -- FACTORY MUTUAL RESEARCH CORPORATION
- I. ICC -- INTERNATIONAL CODE COUNCIL, INC.
- J. IEEE -- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
- K. ISO -- INTERNATIONAL STANDARDS ORGANIZATION
- L. NEBB -- NATIONAL ENVIRONMENTAL BALANCING BUREAU
- M. NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- N. NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION
- O. SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.
- P. UL -- UNDERWRITERS LABORATORIES INC.

#### **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

#### **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 telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary controls: Barriers and enclosures.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 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.

**1.03 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities located at in the building is permitted.
- C. Maintain daily in clean and sanitary condition.
- D. At end of construction, return facilities to same or better condition as originally found.

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

**1.05 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.

## **1.06 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Existing parking areas located at areas identified by Owner may be used for construction parking.

## **1.07 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 daily.
- 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.

## **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. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 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.

**PART 2 PRODUCTS**

**2.01 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.

**2.02 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.

**2.03 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: Architect/Engineer will consider a written request for substitution provided that such request is received at least seven (7) days prior to the Bid opening date. Requests received after that time will not be considered.
  - 1. If a request is approved, the Architect/Engineer will issue an appropriate addendum not less than three (3) days prior to the Bid opening date.
- B. Substitutions After Notice of Award: Architect/Engineer 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. 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. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Agrees to reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction over the Project.
- D. 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 substitutions is expressly identified by Architect/Engineer on Contractor's submittals or not.

### **3.02 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.03 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. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- F. Comply with manufacturer's warranty conditions, if any.
- 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
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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. Cleaning and protection.
- D. Starting of systems and equipment.
- E. Demonstration and instruction of Owner personnel.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

**1.03 SUBMITTALS**

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

**1.04 PROJECT CONDITIONS**

- A. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  - 1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- B. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
  - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes pneumatic hammers.
- C. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

**1.05 COORDINATION**

- A. 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.



- B. Notify affected utility companies and comply with their requirements.
- C. 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.
- D. 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.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS - NOT USED**

## **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 GENERAL INSTALLATION REQUIREMENTS

- A. 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.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### 3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect/Engineer before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on Drawings.
  - 2. Relocate items indicated on Drawings.
  - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- C. 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.
- D. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- E. 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.
- F. Refinish existing surfaces as indicated:
  - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- G. Clean existing systems and equipment.
- H. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

- I. Comply with all other applicable requirements of this section.

### **3.05 PROGRESS CLEANING**

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

### **3.06 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. 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.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.07 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- C. Verify that wiring and support components for equipment are complete and tested.

### **3.08 DEMONSTRATION AND INSTRUCTION**

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

### **3.09 ADJUSTING**

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

### **3.10 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.11 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
- B. Notify Architect/Engineer when work is considered ready for Architect/Engineer's Substantial Completion inspection.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect/Engineer's Substantial Completion inspection.
- D. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- E. Notify Architect/Engineer when work is considered finally complete and ready for Architect/Engineer's Substantial Completion final inspection.
- F. Complete items of work determined by Architect/Engineer listed in executed Certificate of Substantial Completion.

**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 Architect/Engineer 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. Architect/Engineer 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 Architect/Engineer 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. Addenda.
  3. Change Orders and other modifications to the Contract.
- 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. Record Drawings : Legibly mark each item to record actual construction including:
    1. Field changes of dimension and detail.
    2. 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 EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  1. Description of unit or system, and component parts.
  2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.

- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

### **3.04 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 Architect/Engineer, 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.

### **3.05 WARRANTIES AND BONDS**

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

**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. 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 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.
- C. 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.

### **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. Discuss common troubleshooting problems and solutions.
  - 6. Discuss any peculiarities of equipment installation or operation.
  - 7. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
- 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 23 09 13  
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Thermostats.
- B. Damper operators.
- C. Miscellaneous accessories.
- D. Rough-in, wiring to, and final connections to products specified in this Section.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.

**1.03 REFERENCE STANDARDS**

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

**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.

## **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 gauges, 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 DAMPER OPERATORS**

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
  - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
  - 2. Provide one operator for maximum 36 sq ft damper section.
- B. Electric Operators:
  - 1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

### **2.04 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) Duct Averaging Accuracy: Plus/minus 0.50 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 25 degrees F through 122 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 RTD type sensors for extended ranges beyond minus 30 degrees F to 230 degrees F.
    - 3) 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.
  - f. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
  - g. Temperature Averaging Elements:
    - 1) Use on duct sensors for ductwork 10 sq ft or larger.
    - 2) Use averaging elements where prone to stratification with sensor length 8 ft.
    - 3) Provide for all mixed air and heating coil discharge sensors regardless of duct size.
  - h. Insertion Elements:
    - 1) Use in ducts not affected by temperature stratification or smaller than 11 sq inches.
    - 2) Provide dry type, insertion elements for liquids, installed in immersion wells, with minimum insertion length of 2.5 inches.
- B. Humidity Sensors:
- 1. Wall Mounted Sensor: Voltage type encased in a plastic housing.
    - a. Input Power, Voltage Type: Class 2; 12-24 VDC/24 VAC.
    - b. Input Power, mA Type: Class 2; Loop powered 12-30 VDC, 30 mA observed polarity.
    - c. Output Voltage type: 0-10 V.
    - d. Output mA type: 24-20 mA, 2-wire, not polarity sensitive.
    - e. Humidity:
      - 1) Accuracy 2 percent at 10 to 80 percent relative humidity at 77 degrees F.
        - a) Plus/minus 1 percent at 20-40 percent RH in mA output mode; (multi-point calibration, NIST traceable).
      - 2) Scaling: 0-100 percent RH.
    - f. Hysteresis: 1.5 percent typical.
    - g. Linearity: Included in accuracy specification.
    - h. Reset Rate: 24 hours.
    - i. Stability: Plus/minus 1 percent @ 68 degrees F (20 degrees C) annually, for two years.
    - j. Operating Environment:
      - 1) Operating Humidity Range: 0 to 100 percent RH noncondensing.
- C. Static Pressure (Air Pressure) Sensors:
- 1. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
  - 2. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
  - 3. Accuracy: One percent of full scale with repeatability 0.3 percent.

4. Output: 0 - 5 vdc with power at 12 to 28 vdc.

D. Equipment Operation Sensors:

1. Status Inputs for Fans: Differential pressure switch with adjustable range of 0 to 5 inches wg.
2. Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi.
3. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

## 2.05 TRANSMITTERS

A. Building Static Pressure Transmitter:

1. One pipe, differential type with temperature compensation, scale range 0.01 to 6.0 inch wg positive or negative, and sensitivity of 0.0005 inch wg. Transmit electronic signal to receiver with matching scale range.

B. Pressure Transmitters:

1. One pipe direct acting indicating type for gas, liquid, or steam service, range suitable for system, proportional electronic output.

C. Air Pressure Transmitters:

1. General: Provide dry media differential pressure transducers to monitor duct, room, and building pressure.
  - a. Media Compatibility: Dry air.
  - b. Input Power: Class 2; 12-30 VDC; 2 - wire: 20 mA max.
  - c. Output: Field selectable, 2-wire, loop-powered 4-20 mA (DC only, clipped & capped).
  - d. Pressure Ranges: 4 and 7, field selectable.
  - e. Response Time:
    - 1) Standard: T95 in 20 seconds.
    - 2) Fast: T95 in 2 seconds.
    - 3) Switch selectable.
  - f. Mode: Switch selectable, unidirectional.

D. Temperature Transmitters:

1. One pipe, directly proportional output signal to measured variable, linearity within plus or minus 1/2 percent of range for 200 degree F span and plus or minus 1 percent for 50 degree F span, with 50 degrees F. temperature range, compensated bulb, averaging capillary, or rod and tube operation on 20 psig input pressure and 3 to 15 psig output.

E. Humidity Transmitters:

1. One pipe, directly proportioned output signal to measured variable, linearity within plus or minus 1 percent for 70 percent relative humidity span, capable of withstanding 95 percent relative humidity without loss of calibration.

## 2.06 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.

## **2.07 SWITCHES**

- A. Manufacturers
  - 1. IDEC; A-Series
- B. Pilot light and illuminated push button operator device. SPDT switch with green LED lamps.

## **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. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidstats.
- C. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
- D. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- E. 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.

**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. 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 23 52 16 - Condensing Boilers: Boiler sequencing system.

**1.03 REFERENCE STANDARDS**

- A. ANSI/CEA 709.1.D - Control Network Protocol Specification; 2014.
- B. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2012.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SYSTEM DESCRIPTION**

- A. Provide all labor, materials, equipment and service necessary for a complete operating Building Management and Control System (BMS), utilizing Direct Digital Controls (DDC) as shown on the drawings and as described herein. Drawings are diagrammatic only. The BMS shall be capable of total integration of the facility infrastructure system with user access to all system data either locally over a secure intranet within the building or by remote access by a standard web browser over the internet. This shall include HVAC control energy management, alarm monitoring, and all trending, reporting and maintenance management function related to normal building operations, all as indicated on the drawings or elsewhere in this specification.
- 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. Provide a color graphical representation of all systems. The graphical display shall include all points indicated in the points 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. The individual floor plan zones shall change color based upon the difference between the actual zone temperature and zone set point so that the operator can tell at a glance if zones are in, above or below acceptable ranges. A minimum of five (5) colors are required: Color 1 = within acceptable range of set point, Color 2 = warning - zone is above acceptable range of set point and approaching high temperature alarm; Color 3 = zone is in high temperature alarm; Color 4 = warning - zone is below acceptable range of set point and approaching low temperature alarm; Color 5 = zone is in low temperature alarm.
4. Clicking on a floor plan zone shall bring up a dynamic color graphic of the mechanical equipment that serves that zone.
5. 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.
6. Text-based (non-pictorial) summary screens will also be provided so that the operator may view critical information on multiple units at once. Summary screens will be provided for terminal units and air handling units. Summary screens for VAV/FPVAV boxes will contain as a minimum room temperature, room temperature set point, occ/unocc status and CFM for each box. Summary screens for AHUs will contain as a minimum space temperature (CV units) or discharge temperature (VAV units) and the corresponding set point, static pressure (VAV units), OA damper position, mixed air temperature, fan status and occ/unocc status.
7. Clicking on a unit on any summary screen shall bring up the complete graphic for that unit.
8. 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, interoperable system.
- B. The supplied computer software shall employ 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 peer-to-peer communicating devices. Components or controllers requiring polling 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). Secure 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 WEB BROWSER CLIENTS**

- A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacturer-specific browsers shall not be acceptable.
- B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the BMCS shall not be acceptable.
- C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface (GUI). Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
- D. The Web browser client shall support at a minimum, the following functions;

1. User log-in identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
  2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
  3. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
  4. Storage of the graphical screens shall be in the Network Area Controller (NAC) without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
- E. FX80E network device shall be Tridium 4 based. If at the time of this installation the platform is not available, contractor shall return when it is available during the two year maintenance period (included as part of this contract) and upgrade the site to the Tridium 4 software platform, with no additional cost to the Owner.

## **1.07 SUBMITTALS**

- A. Product Data: Provide data for each system component and software module.
- B. 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.
- C. 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.
- D. 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.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- F. System Subscription: Provide three year subscription for control system software upgrades. Contractor to provide system upgrade a minimum of once per year during three year subscription.

## **1.08 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 of documented experience and approved by manufacturer.

## **1.09 PROTECTION OF SOFTWARE RIGHTS**

- A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:
  - 1. Limiting use of software to equipment provided under these specifications.
  - 2. Limiting copying.
  - 3. Preserving confidentiality.
  - 4. Prohibiting transfer to a third party.
- B. Provide Owner administrative rights after warranty period expires.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Johnson Controls, Inc; Facility Explorer, FX80.
  - 1. Installing Contractors;
    - a. Applied Controls, Inc. (Warrenville, IL)
    - b. Integrated Control Technologies (West Chicago, IL)
    - c. Interactive Building Solutions (Joliet, IL)

### **2.02 SYSTEM DESCRIPTION**

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.
- 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. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- E. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

### **2.03 OPERATOR INTERFACE**

- A. PC Based Work Station:
  - 1. Resides on high speed network with building controllers.

- B. Workstation, controllers, and control backbone to communicate using BACnet protocol and addressing.
- C. BACnet protocol to comply with ASHRAE Std 135.
- D. LonTalk protocol to comply with ANSI/CEA 709.1.D.
- E. Hardware:
  - 1. Desktop:
    - a. Computer(s) and display(s) to be provided by DDC controls manufacturer.
    - b. Quantity: One.
    - c. Configuration: IBM-compatible core I5 based microcomputer system or better.
    - d. Minimum RAM: 8 Gb.
    - e. Minimum Processing Speed: 3.10 GHz.
    - f. Minimum Hard Drive Memory: 1 Tb.
    - g. Drives: CD/DVD RW.
    - h. Ports: Minimum 4 USB.
    - i. Monitor: Super video color graphics adapter (SVGA), 21 inch non-interlaced color monitor, maximum 0.28 mm dot pitch.
    - j. Mouse: Software supported mouse with support software including self building menus and displays of system operations and functions.
    - k. Keyboard: Low profile, detachable, having Qwerty layout plus a 10 key numeric keypad, dedicated function keys.
    - l. Operating System: Windows 10I.
    - m. Location(s): As indicated on the Drawings.
    - n. Network Connection:
      - 1) Ethernet interface card.
    - o. System Printer:
      - 1) Printer(s) to be provided by DDC controls manufacturer.
      - 2) Quantity: One.
      - 3) Type: Wide carriage with output of ten characters per inch and 132 characters per line of paper, capable of using fan-fold paper.
      - 4) Minimum Print Speed: 120 characters per second.
      - 5) Paper: Two cartons fanfold paper containing minimum 2500 sheets.
      - 6) Location(s): As directed by the Owner.

## **2.04 CONTROLLERS**

### **A. BUILDING CONTROLLERS**

- 1. General:
  - a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
  - b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
  - c. Share data between networked controllers.

- d. 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.
  - e. Utilize real-time clock for scheduling.
  - f. Continuously check processor status and memory circuits for abnormal operation.
  - g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
  - h. Communication with other network devices to be based on assigned protocol.
2. Communication:
    - a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
    - b. Perform routing when connected to a network of custom application and application specific controllers.
    - c. 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. 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. 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.
    - b. Acceptable Operating Systems: Microsoft Windows 10.
  2. System Graphics:
    - a. Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.
    - b. Animation displayed by shifting image files based on object status.
    - c. 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) Boilers.
  - 2) Air Handlers.
  - 3) Terminal HVAC Units.
  - b. Ancillary Equipment:
    - 1) Fans.
    - 2) Pumps.
    - 3) Coils.
    - 4) Valves.
    - 5) Dampers.
- B. Workstation System Applications:
1. Automatic System Database Save and Restore Functions:
    - a. Current database copy of each Building Controller is automatically stored on hard disk.
    - b. Automatic update occurs upon change in any system panel.
    - c. In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
  2. Manual System Database Save and Restore Functions by Operator with Password Clearance:
    - a. Save database from any system panel.
    - b. Clear a panel database.
    - c. Initiate a download of a specified database to any system panel.
  3. Software provided allows system configuration and future changes or additions by operators under proper password protection.
  4. On-line Help:
    - a. Context-sensitive system assists operator in operation and editing.
    - b. Available for all applications.
    - c. Relevant screen data provided for particular screen display.
    - d. Additional help available via hypertext.
  5. Security:
    - a. Operator log-on requires user name and password to view, edit, add, or delete data.
    - b. System security selectable for each operator.
    - c. System supervisor sets passwords and security levels for all other operators.
    - d. Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
    - e. Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
    - f. All system security data stored in encrypted format.
  6. System Diagnostics:
    - a. Operations Automatically Monitored:
      - 1) Workstations.
      - 2) Printers.
      - 3) Modems.
      - 4) Network connections.
      - 5) Building management panels.
      - 6) Controllers.
    - b. Device failure is annunciated to the operator.
  7. Alarm Processing:



- a. All system objects are configurable to "alarm in" and "alarm out" of normal state.
- b. Configurable Objects:
  - 1) Alarm limits.
  - 2) Alarm limit differentials.
  - 3) States.
  - 4) Reactions for each object.
- 8. Alarm Messages:
  - a. Descriptor: English language.
  - b. Recognizable Features:
    - 1) Source.
    - 2) Location.
    - 3) Nature.
- 9. Configurable Alarm Reactions by Workstation and Time of Day:
  - a. Logging.
  - b. Printing.
  - c. Starting programs.
  - d. Displaying messages.
  - e. Dialing out to remote locations.
  - f. Paging.
  - g. Providing audible annunciation.
  - h. Displaying specific system graphics.
- 10. Custom Trend Logs:
  - a. Definable for any data object in the system including interval, start time, and stop time.
  - b. Trend Data:
    - 1) Sampled and stored on the building controller panel.
    - 2) Archivable on hard disk.
    - 3) Retrievable for use in reports, spreadsheets and standard database programs.
    - 4) Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
    - 5) Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.
- 11. Alarm and Event Log:
  - a. View all system alarms and change of states from any system location.
  - b. Events listed chronologically.
  - c. Operator with proper security acknowledges and clears alarms.
  - d. Alarms not cleared by operator are archived to the workstation hard disk.
- 12. Object, Property Status and Control:
  - a. Provide a method to view, edit if applicable, the status of any object and property in the system.
  - b. Status Available by the Following Methods:
    - 1) Menu.
    - 2) Graphics.
    - 3) Custom Programs.
- 13. Reports and Logs:
  - a. Reporting Package:

- 1) Allows operator to select, modify, or create reports.
- 2) Definable as to data content, format, interval, and date.
- 3) Archivable to hard disk.
- b. Real-time logs available by type or status such as alarm, lockout, normal, etc.
- c. Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
- d. Set to be printed on operator command or specific time(s).

14. Reports:

- a. Standard:
  - 1) Objects with current values.
  - 2) Current alarms not locked out.
  - 3) Disabled and overridden objects, points and SNVTs.
  - 4) Objects in manual or automatic alarm lockout.
  - 5) Objects in alarm lockout currently in alarm.
  - 6) Logs:
    - a) Alarm History.
    - b) System messages.
    - c) System events.
    - d) Trends.
- b. Custom:
  - 1) Daily.
  - 2) Weekly.
  - 3) Monthly.
  - 4) Annual.
  - 5) Time and date stamped.
  - 6) Title.
  - 7) Facility name.

C. Workstation Applications Editors:

1. Provide editing software for all system applications at the PC workstation.
2. Downloaded application is executed at controller panel.
3. Full screen editor for each application allows operator to view and change:
  - a. Configuration.
  - b. Name.
  - c. Control parameters.
  - d. Set-points.
4. Scheduling:
  - a. Monthly calendar indicates schedules, holidays, and exceptions.
  - b. Allows several related objects to be scheduled and copied to other objects or dates.
  - c. Start and stop times adjustable from master schedule.
5. Custom Application Programming:
  - a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
  - b. Programming Features:
    - 1) English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.

- 2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
- 3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
- 4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
- 5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
- 6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
- 7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.
- 8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values can be used in IF/THEN comparisons, calculations, programming statement logic, etc.
- 9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

## **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. Sequencing: Application software based upon specified sequences of operation shown on the Drawings.
- H. 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.
- I. Staggered Start Application:
- 1. Prevents all controlled equipment from simultaneously restarting after power outage.
  - 2. Order of equipment startup is user selectable.
- J. Anti-Short Cycling:
- 1. All binary output objects protected from short-cycling.
  - 2. Allows minimum on-time and off-time to be selected.
- K. 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.
- L. 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.
- B. Optimal Run Time:
- 1. Control start-up and shutdown times of HVAC equipment for both heating and cooling.
  - 2. Base on occupancy schedules, outside air temperature, seasonal requirements, and interior room mass temperature.
  - 3. Start-up systems by using outside air temperature, room mass temperatures, and adaptive model prediction for how long building takes to warm up or cool down under different conditions.
  - 4. Use outside air temperature to determine early shut down with ventilation override.

## **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. All exposed conduit wiring that is not located above an accessible ceiling shall be installed in conduit. This includes all storage room, mechanical rooms, etc.

### **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 up to 6 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 8 hours dedicated instructor time (two 4 hour sessions). Training shall occur at substantial completion and 6 months after. Provide training on site.

### **3.04 DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate complete and operating system to Owner.

### **3.05 MAINTENANCE**

- A. Provide service and maintenance of energy management and control systems for two years from Date of Substantial Completion.

**END OF SECTION**

**SECTION 23 52 16  
CONDENSING BOILERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Boiler sequencing system.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.
- B. Section 23 09 23 - Direct-Digital Control System for HVAC.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittals 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. Manufacturer's Installation Instructions: Indicate assembly, support details, connection requirements, and include start up instructions.

**1.04 QUALITY ASSURANCE**

- A. The equipment shall be in strict compliance with the requirements of this specification and shall be the manufacturer's standard commercial product unless specified otherwise. Additional equipment features, details, accessories, etc. which are not specifically identified but which are a part of the manufacturer's standard commercial product, shall be included in the equipment being furnished.

**PART 2 PRODUCTS**

**2.01 BOILER SEQUENCING SYSTEM**

- A. Manufacturers;
  - 1. Synex Controls: Model ModSync.
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. The boiler sequencing system will be a microprocessor based process controller with a graphical user interface and touchscreen capabilities. Boiler sequencing systems designed with alpha-numeric displays will not be acceptable due to their limited functionality.
- C. The active touchscreen display area will be a minimum of 5.7" with a color TFT display resolution of 256 colors.
- D. The boiler sequencing system enclosure will be NEMA 4X construction. The enclosure shall be designed with the ability of be located in outdoor environments. Mounting of the boiler sequencing system inside another panel to provide an outdoor rating will not be acceptable due to the increased access time requirements to view and modify the system parameters. Power requirements for the boiler sequencing panel will be 120/60/1.

- E. The boiler sequencing system will be a wall mounted, stand-alone unit. Local boiler controls with integrated lead/lag logic are not acceptable due to their limited logic capabilities and rewiring requirements in the event of a sensor or local controller error.
- F. Password requirements will prevent access to any of the screens where system configuration parameters can be adjusted, while maintaining the ability of viewing the system performance.
- G. Outdoor and Supply Header Temperature sensors supplied with the boiler sequencing system shall be PT-100 RTD type for precise temperature monitoring. Return Temperature monitoring capabilities shall be available and used when BTU calculation is used. The boiler sequencing system will also have the ability to receive temperature values from the Building Management System through a communication protocol. Each temperature input shall have a selection button that allows for independent configuration of where the temperature value will be received from.
- H. The boiler sequencing system will provide a series of "Question and Answer" screens to simplify the commissioning process.
- I. Multiple Status and Configuration Screens will be available for easy interpretation of the hydronic loop status and simplified control configuration of the multiple hydronic boiler system.
- J. Minimum screens available shall include:
  - 1. Outdoor Reset Configuration
    - a. Setback Schedule
    - b. Lead/Lag Configuration
    - c. Boiler Configuration
    - d. System Status
    - e. Alarm Status
    - f. Alarm History
- K. The hydronic boilers shall be controlled as follows to maximize their operating efficiency:
  - 1. The sequencing system shall monitor the outdoor temperature and calculate a hydronic loop temperature set point based on touchscreen selectable user-defined values. The boiler sequencing system will stage operation of the hydronic boilers based on the difference between the actual hydronic loop temperature and the calculated
    - a. (outdoor air reset) hydronic loop temperature set point.
    - b. When a requirement for heat is determined by the boiler sequencing system, the lead boiler is energized and its firing rate is maintained at low fire.
    - c. If the hydronic loop temperature continues to decrease, the boiler sequencing system will enable a lag boiler. The first lag boiler is energized and the lag boiler's firing rate is maintained at low fire.
    - d. As additional heat is required, the boiler sequencing system will enable the remaining lag boiler stages individually until all of the available boilers in the hydronic loop have been energized. Each boiler will remain at low fire until all of the stages have been enabled.
    - e. If all of the hydronic boilers are enabled and additional heat is required, the boiler sequencing system will release the boilers to modulate. Operating hydronic boilers at lower firing rate levels provides significant efficiency gains. Therefore, hydronic boilers will modulate together as a single unit to keep the hydronic boiler system at the lowest possible firing rate, while satisfying the building load demands.

- f. As the hydronic loop temperature increases, the boiler sequencing system will decrease the firing rate of the hydronic boilers to maintain the hydronic loop temperature. If all of the hydronic boilers are at low fire and the hydronic loop temperature continues to rise, the boiler sequencing system will begin to stage the boilers off. The first lag boiler stage energized will be the last stage to be disabled. The hydronic boilers will continue to be disabled by the boiler sequencing system based on the temperature rise of the hydronic loop.
        - g. The lead boiler is disabled when the hydronic loop temperature reaches a selectable value referenced around the hydronic loop set point.
- L. Outdoor Reset - As the outdoor temperature increases, the hydronic loop set point can decrease while still maintaining the desired building temperature.
  - 1. The boiler sequencing system shall provide Outdoor Reset Configuration Screens that include all of the parameters required to effectively configure the hydronic loop set point based on the outdoor temperature.
    - a. The boiler sequencing system will provide an adjustable reset schedule based on the outdoor temperature. A linear outdoor reset ratio will be determined based on user-defined hydronic loop temperatures at 50°F and 0°F outdoor temperatures. Outdoor temperature configuration variables shall be adjustable through the touchscreen to match designed reset schedule requirements. A reference graphic detailing the calculated reset ratio will be displayed on the Outdoor Reset Configuration screen.
    - b. Minimum and maximum loop temperature parameters will prevent the outdoor reset schedule from operating outside of a user-defined temperature range.
    - c. A user-defined Outdoor Temperature Disable parameter will be provided to disable the hydronic loop if a predetermined outdoor temperature is reached. A hysteresis variable will prevent the hydronic system from re-enabling until the outdoor temperature decreases a user-defined amount.
    - d. To meet multiple system control configurations, set point mode adjustment capabilities will be included as standard with the boiler sequencing system. set point Modes will include Outdoor Reset, 4-20mA Remote set point, BMS Communication or Manual. The set point mode shall be field adjustable by a touchscreen selection button on the set point Configuration screen.
- M. Setback Configuration Screens shall be provided to adjust the hydronic loop set point based on Day of the Week/Time of Day variables.
  - 1. Multiple setback schedules shall be available based on whether the building is in Occupied or Unoccupied mode. Building Mode selection shall be determined by a user-defined Time of Day / Day of Week touchscreen entry. The Building Mode will automatically change between Occupied and Unoccupied based on the user programmed day and times. Manual Building Mode control shall also be available via a Setup menu. Building Mode shall be indicated on the Loop Status Screen for ease of reference.
    - a. An Anticipation Mode feature shall be provided to automatically switch to Occupied Mode a selectable number of hours earlier than scheduled if the outdoor temperature lowers below a user-defined temperature during the Unoccupied Mode.
- N. Lead/Lag Configuration screens shall be used to configure how the hydronic boilers will be assigned and enabled in the control sequence.



1. The boiler sequencing system will include automatic rotation of the lead boiler based on a user configured lead boiler cycle count or run hours, whichever setting occurs first.
  - a. When the lead cycle or run hours rotation value is reached, the boiler sequencing system will assign each boiler's position in the lead/lag sequence based on their previous operating history. Boiler sequencing systems that simply rotate the lead position to the next boiler in the sequence will not be acceptable due to their ineffective ability of maintaining an even cycle count across all of the boiler stages in the hydronic loop.
  - b. The boiler sequencing system will stage the boilers based on a PID generated control variable value. The Proportional, Integral and Derivative values shall be user-defined through the Lead/Lag Configuration screen. Each lag boiler stage will be enabled and disabled based on a user-defined control variable percentage. Properly tuned loops will provide temperature control accuracy up to +/- 2°F, based on load demand.
    - 1) Lead boiler start and stop parameters shall be user-defined through the touchscreen operator interface. A Manual Reset parameter will allow the Proportional Band to be shifted around set point.
  - c. A user-defined time delay parameter will be provided that delays enabling and disabling of the lag boiler stages. This helps to decrease cycling of the lag stages when the building load is close to being satisfied.
  - d. The boiler sequencing system will have the ability to monitor the outlet temperature of each hydronic boiler in the system. This feature is beneficial for systems that will incorporate variable flow designs. If the boiler outlet temperature exceeds set point by a user-defined amount, the boiler sequencing system will automatically lower the firing rate of the boiler to help prevent a high limit trip at the boiler. As the boiler outlet temperature decreases below a defined variable, the boiler sequencing system will allow the firing rate of the boiler to increase.
- O. Boiler Configuration screens will display information regarding each boiler stage in the hydronic loop.
  1. The boiler configuration screens will detail and provide:
    - a. - Hydronic Boiler Status.
    - b. - Hydronic Boiler Cycles, Run Hours and Cycle/Hour Ratio calculation.
    - c. - Hydronic Boiler Outlet Temperature.
    - d. - Hydronic Boiler Enable/Disable touchscreen selection.
    - e. - Hydronic Boiler Auto/Manual touchscreen control mode selection.
    - f. - Hydronic Boiler Manual touchscreen Start/Stop and Firing Rate control.
    - g. The boiler sequencing system shall include capabilities to enable/disable the boilers through the operator interface. Boilers that are disabled will not be included in the sequencing logic.
- P. The boiler sequencing system will monitor the operation and status of all temperature sensors and hydronic boilers in the loop. Sensor errors will be annunciated on the boiler sequencing systems alarm screen. If an outdoor temperature sensor error occurs, the boiler sequencing system will automatically switch to manual set point mode and will annunciate the alarm condition.
- Q. The boiler sequencing system will start a timer when each boiler stage is enabled to run. If the main gas valves do not energize within the user-defined timeframe then a local limit is preventing the boiler from operating. The boiler sequencing system will immediately remove the boiler from

the lead/lag sequence and annunciate that a local boiler error exists. An automatic reset option will allow the boiler to be re-enabled after a user-defined timeframe has elapsed.

- R. An Alarm Status screen will give a text description of any current alarm conditions. Boiler sequencing systems that use codes or symbols to detail alarm conditions will not be acceptable. The boiler sequencing system will automatically adjust the boiler sequencing status and remove the boiler from the sequencing logic if an alarm occurs. The boiler will automatically be added back into the rotation loop as soon as the boiler sequencing system senses that the alarm has been cleared.
- S. The boiler sequencing panel will include an Alarm History screen that allows for the
- T. last 100 alarm conditions to be viewed. A Date/Time stamp and text description of each alarm condition in the history will be available.
- U. A System Status screen will detail current outdoor, hydronic system and control variable values. The status screen will also display enable/disable and firing rate information for each of the boilers in the hydronic loop.
- V. Trending of the supply temperature, system set point and outdoor temperature will be displayed to provide system operational history for tuning of the PID and lead/lag parameters.
- W. The boiler sequencing system will have the ability to communicate to a Building Management System using multiple protocols including Modbus RTU, BacNet, LonWorks or N2. Standard point mapping will be provided with the boiler sequencing system. Selection of modbus serial connectivity (RS-232/RS-485) and baud rate will be field-adjustable using a configuration screen on the boiler sequencing system. Selection of BacNet MS/TP or IP shall be field adjustable through a dip-switch setting. The ability to field adjust custom project points will be available through a easy to configure and freely distributed software package.
- X. The boiler sequencing system shall have the ability for the internal control logic to be field-modified to meet system design changes that may arise during commissioning of the hydronic system or future system expansion. The control logic shall be field adjustable through a downloadable, freely distributed software package that does not require a licensing fee. Sequencing systems with fixed control logic that cannot be modified in the field will not be acceptable due to their inherent limitations.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
  - 1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in of piping and electrical connections.
- B. Examine mechanical spaces for suitable conditions where boilers will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 BOILER INSTALLATION**

- A. Install gas-fired boilers according to NFPA 54.
- B. Assemble and install boiler trim.
- C. Install electrical devices furnished with boiler but not specified to be factory mounted.
- D. Install control wiring to field-mounted electrical devices.

### **3.03 CONNECTIONS**

- A. Install piping adjacent to boiler to allow service and maintenance.
- B. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- C. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of equipment connection. Provide a reducer if required.
- D. Connect hot-water piping to supply and return boiler tapplings with shutoff valve and union or flange at each connection.
- E. Install piping from safety relief valves to nearest floor drain.
- F. Boiler Venting:
  - 1. Install flue venting kit and combustion-air intake.
  - 2. Connect full size to boiler connections.
- G. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- H. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Perform installation and startup checks according to manufacturer's written instructions. Complete startup form included with Boiler and return to Manufacturer as described in the instructions.
  - 2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
    - a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level and water temperature.

- b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

### **3.05 DEMONSTRATION**

- A. Engage a factory representative or a factory-authorized service representative for boiler startup. Start-up sheet shall be completed and a copy shall be sent to the Engineer and the Manufacturer. A combustion analysis shall be completed and the gas valve adjusted per the Installation and Operations manual and note in start-up report.
- B. Factory representative or a factory-authorized representative shall provide Owners training to instruct maintenance personnel to adjust, operate, and maintain boilers.

**END OF SECTION**